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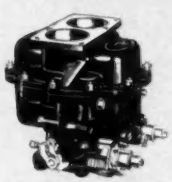

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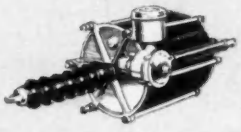

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Manufacturer's Viewpoint on...

HEAVY CARGO AIRPLANES

by HARRY WOODHEAD
President, Consolidated Aircraft Corp.

"We will never return to the custom building of aircraft."

★ ★ ★

FROM a production standpoint we have learned that there are no insurmountable obstacles in building large planes capable of carrying heavy cargoes. When I first went to Vultee, the company was building a comparatively small basic training plane having but one engine and carrying only student and instructor. I was told that the plane had to be custom-built under the old job-shop methods, and that mass production methods, similar to those employed in creating radios, automobiles, refrigerators and many other things, would not work out in aircraft manufacture.

But before long, a mechanized assembly line was in operation, turning out airplanes in heavy volume.

Consolidated, seeing the success of this method, started a conveyor line for the Liberators, in the face of the fact that critics, already once put in their places, contended that a small plane might be produced en masse, but that no 28-ton airplane could be so manufactured.

Excerpts from talk made to SAE So. California Section, San Diego, Calif., Feb. 5, 1943.

But the Liberator conveyor line was successful. Today, the Coronado, weighing 33 tons loaded, having a wingspan of 115 ft, which is 5 ft longer than the Liberator, also is being built on a conveyor line. I have gone out onto the proverbial limb to say that if we needed enough battleships to justify this philosophy of production, they too could be produced on mechanized assembly lines. I'll say that again, just to keep the record straight. But I doubt very much that in this war we'll ever get around to building airplanes as big as battleships.

But do not let me make a hero out of the conveyor line. The real heroes of production in the aircraft industry are the tool men and assembly planners who broke down the complex airplanes into the many, many small assemblies and smaller jobs, and the workers who very quickly learned to perform those jobs efficiently. At the start of all-out airplane production, the planes were built by craftsmen who did a series of long and complicated operations. It would have taken four years to train these men.

We found, even before Pearl Harbor, that we needed thousands upon thousands of these craftsmen. We could not wait four years. Airplanes, thousands of airplanes, had

to be built right now. The result was the breaking down of the airplane into very small jobs. Until this was accomplished, the assembly line was not possible.

From a standpoint of design, how large can airplanes be built? The preliminary design engineers at Consolidated tell me that, including the projected 400-passenger model, we have not in any of our contemplated designs reached a limit on size. In other words, big as our designs now are, we are still going strong. To me, the question is not how large we can make the planes, but what is the most economical size? What is the most practical, efficient size?

It's surprising how you can chase yourself around at this point, and do nothing but trip over your own neck. One school argues that big airplanes are like ocean liners – get them too big, and they aren't economical. Another school asks, "What do you consider a big airplane?"

At this point, the argument can become endless.

The question is constantly arising as to what materials will be used in the large airplanes to come. It is my personal belief that steel will be used more and more as aircraft increase in size and weight.

In addition to the material used in making a large airplane, it is very necessary to consider the type of construction. One factor which must be stressed in design is whether or not the plane is readily serviceable. As we get into the building of the large planes, service problems arise, such as the facilities at points where the planes land to load and unload. We must have a plane which can be quickly and easily repaired and overhauled. This goes right back to design.

To illustrate, in the early days of the automotive industry, there were very few transcontinental truck lines. Now, trucks go everywhere. You find a service station at almost every cross-road. I would say that in addition to good roads, simplified design, making repairs easy, and thousands of roadside mechanics did much to make the expansion of the trucking industry possible. In aircraft operation we do not have the roads to contend with. Therefore all we really need, after design is simplified, are suitably manned facilities along our routes. We must build planes not only to fly, but to keep on flying.

Harry Woodhead Highlights –

"THE term 'large' cargo airplanes should be used, rather than 'heavy' cargo airplanes, I believe. What we are concerned with is large airplanes capable of carrying heavy loads, not heavy airplanes."

★ ★ ★

"The real heroes of aircraft production are tool men and assembly planners who broke down complex airplanes in many, many assemblies and smaller jobs . . . and the workers who quickly learned to perform those jobs efficiently."

★ ★ ★

"Big as our designs are now, we have not in any of our contemplated designs reached a limit on size."

★ ★ ★

"The question now is not *how large* we can make planes, but what is the *most economical* size."

★ ★ ★

"Steel will be used more and more as aircraft increase in size and weight."

★ ★ ★

"Conversion (of military to cargo planes) after the war will be strictly a compromise measure – a stop-gap."

★ ★ ★

"We will never return to the custom-building of aircraft . . . We can use the conveyor line to make lots of 50 more economically than if we went back to our pre-war methods."

■ Converting War Models

Another phase which must be considered, and which enters into the field of manufacture, is the possibility of converting wartime military models to peacetime needs.

"There will be little post-war manufacture," the arm-chair experts will tell you. "That stuff we're flying now can be made over easily into commercial transports."

I'll argue the point, conceding that there may be some conversion after the war. But it will be strictly a compromise measure – a stop-gap, or fill-in operation. And, furthermore, it will be very temporary. This will be true even if, as the arm-chair boys contend, the military planes can be bought up cheaply.

Even today, our military airplanes are built for high performance and specific missions. Fuselages are small, allowing them to carry just enough crew, armament and bombs to get there, do the job and return as quickly as possible. For example, a fuselage 10 ft in diameter can carry a bomb load of 20 tons. It would have to be of much greater diameter to carry 20 tons of passengers or normal cargo. We have hung on tons of military gadgets; in fact we have actually designed them into the military ships.

Remember that after the war we must aim at economy of operation as well as construction. To do this we must redesign and build new airframes. The longer the war lasts, the greater will become the gap between military and commercial designs. Right now, you can see the ever-growing difference day by day.

■ Post-War Predictions

There are several other things we must consider in looking at the post-war picture. One is that while the gap between military and commercial types is widening, we will use the principles developed in war and adapt them to our commercial designs. Another is that when the war is over we will be able to standardize our designs to a greater degree and use them for several years. This is in direct contrast to our present daily changing to meet the con-

stantly arising emergencies of wartime. Obviously, it will result in considerable economy.

I do not believe we will ever return to the custom-building of aircraft. If we do, the industry will slip back into the doldrums and will lose all it has gained. If it hasn't learned the lesson of production as taught by the war, it might as well not have learned anything. In the period which is ahead of us – a period of fierce post-war competition – we will have to intensify our efforts to produce economically and efficiently instead of reverting to the old job shop methods.

When I refer to mass production, don't get the idea that I am dreaming of skies black with airplanes. I do not mean that we will have to produce airplanes by the tens of thousands and the hundreds of thousands, as we are doing today. It is not necessary in mass production to do this. The same ideas we have developed to date can be applied readily to small batches of airplanes. And, even on one assembly line, we do not have to concentrate on one model of a given airplane. I don't mean by this that one ship coming off might be a four-engined Liberator and the next a Vultee trainer. The planes on the line must be of the same general size and design.

As an example, let us again go to the automotive industry. Prior to the war, basic yearly models came off the conveyor line in all sorts of shapes, sizes and colors. There would be a blue seven-passenger sedan, then a green convertible, and then a brown coupe. We may not be able to specialize to this extent in the aviation industry, but it will be possible to run 50 units of one model down the line, and then run 50 of another, and 50 of still another. To accomplish this we would use adjustable jigs and fixtures, the existing stockrooms, and station facilities along the line.

It is true that we would like to contemplate building aircraft in lots of 500 rather than in lots of 50 because we could do it more economically, at less cost per unit, and pass the saving on to the purchasers. However, I can assure you that we can use the conveyor line to make lots of 50 more economically than we could make them if we went back to the outmoded pre-war methods. The only problem in this type of production which I see is to time it so that the components of the models come together at the right point at the right time.

We can build anything that our customers specify, even if it is big as a battleship. We'll build anything the designers give us to build. If it is efficient and enduring, we'll produce as many units as are wanted.

Ordnance Organization Meets Vast War Expansion*

by BRIG.-GEN. HERMON F. SAFFORD
Chief of Production Service Branch
Office Chief of Ordnances

THE ordnance engineering knowledge and experience gained at our arsenals under very adverse conditions since the last war have been freely given and used to assist American industry in converting their efforts from peace to wartime production. Theirs is the knowledge born of many years of ordnance experience. This, coupled with the well-known capabilities for mass production of American industry, makes an unbeatable combination. *Our combat troops have not suffered in battle for the lack of ordnance.*

The quality of war material, as well as excellence of design, are responsible for the soldier's faith in the dependability of his weapons. This requires an efficient and thorough system of inspection. At the start of this war, the Ordnance Department had less than 200 experienced inspectors. From this nucleus, it was necessary to build up an inspection organization to take care of some 10,000 prime contracts and 70,000 subcontracts. Training schools were set up in our arsenals and universities in order to prepare these new inspectors for their duties as well as time would permit. The total civilian inspection force now operating on all of these ordnance contracts is slightly over 21,000 – an increase of 10,000%.

As might be expected in work of this nature, we had and still have our troubles, but as time goes on, this force gains in experience, and the complaints received due to the improper exercise of judgment by inexperienced inspectors are being materially reduced. Such complaints are seldom due to acceptance of inferior material, but generally to an exaggerated demand for perfection.

It is fundamental in the organization of the Ordnance Department that the final inspection of any ordnance material be performed by a unit completely independent of the unit responsible for production. In Ordnance arsenals, the final inspection is performed by inspectors who are responsible to the commanding officer alone. The commanding officer is responsible for the quality of the items.

The same principle holds true in the acceptance of material produced by industry. In this case, final inspection is performed by inspectors responsible only to the chief of the Ordnance District in which the item is fabricated.

In addition thereto, the manufacturer is required to perform such inspection duties as necessary to assure himself that his product as submitted for final inspection and acceptance complies with drawings and specifications.

For each item of ordnance, complete sets of inspection gage drawings are provided. The Ordnance Gaging System insures complete interchangeability of parts and is recognized as an engineering masterpiece.

In addition, the Ordnance Department operates proving grounds for sample testing. Ammunition samples from each lot are subjected to firing tests prior to final acceptance. Cannon are sent to the proving grounds for firing tests, as well as selected combat vehicles. These proving ground tests serve as an independent check on the effectiveness of plant inspection. . . .

It will be immediately apparent to any production engineer that the planning and scheduling of ordnance production is a job of the first magnitude. Production planning has been studied by the Ordnance Department for years to the end that when an emergency arose, the methods for assuring balanced production of ordnance items would already be established.

[*Excerpts from a speech entitled "Production Paces the United Nations Offensive," made at the meeting of the Washington Section, Feb. 15, 1943. (See also p. 24 of this issue.)]

AIRCRAFT STANDARDS F

by J. D. REDDING

SAE Staff Representative, Aeronautical Activities

Here, for the first time, a complete resume of the SAE aeronautical standards program is presented. Committee members are shown, beginning on page 25.

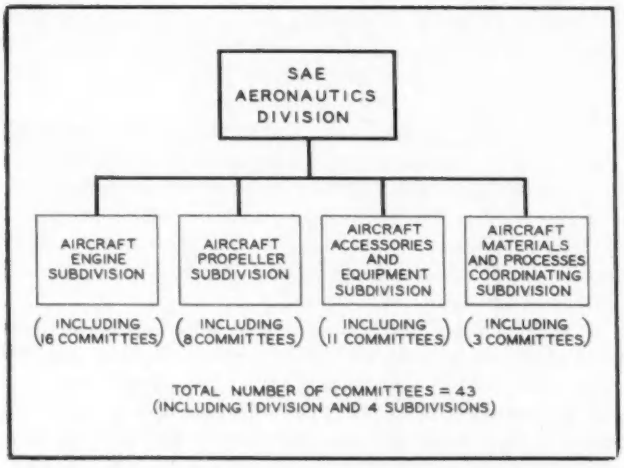
The potency of these SAE aeronautical standardization achievements is recognized chiefly by those who have been active in their production as well as in their use—and by those who were quick to see them as a key to acceleration of the war aeronautical program of the United States . . . the program which itself may well be the key to victory for the United Nations.

■ ■ ■

Complete knowledge of these SAE results, coupled with an understanding of the processes through which they have been obtained, cannot fail to enhance the usefulness of the results themselves. To increase this knowledge and this understanding is the purpose of this paper.

MARCH 1, 1943, marks the completion of two years of accelerated, intensive standardization work by the United States' aircraft industry. Both industry and Government, of course, had been engaged in aeronautical standardization for many years previously, but war pressures in the last 24 months have transfigured into dynamic action what formerly were little more than routine efforts.

[This paper was presented at a meeting of the SAE So. California Section, Hollywood, Calif., March 5, 1943.]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AIRCRAFT ENGINE SUBDIVISION
AIRCRAFT PROPELLER SUBDIVISION
AIRCRAFT ACCESSORIES AND EQUIPMENT SUBDIVISION
AIRCRAFT MATERIALS AND PROCESSES COORDINATING SUBDIVISION
INCLUDING (6 COMMITTEES)
INCLUDING (8 COMMITTEES)
INCLUDING (11 COMMITTEES)
INCLUDING (3 COMMITTEES)
TOTAL NUMBER OF COMMITTEES = 43
(INCLUDING 1 DIVISION AND 4 SUBDIVISIONS)

Fig. 1 – Organization chart of SAE Aeronautics Division

Standardization is going along with mass production – just as it has in other industries in the past. Wide areas already have been covered; even vaster ones lie ahead.

The SAE aeronautical standardization program itself pictures dramatically the increased tempo which war has brought in this field. It emphasizes the striking power of standards wrought by voluntary cooperative effort of many engineers to accelerate production, improve quality, conserve materials, and provide a basis for victory maintenance on battlefronts throughout the world. Aircraft engines, propellers, and accessories all are benefiting from the standardization of dimensions, nomenclature, inspections, and tests which this program already has completed – while these units, and airframes as well, are profiting vitally from its Aeronautical Material Specifications (AMS), of which more than a million and a half copies have been distributed to date.

There are three phases in the successful completion of such a project as the present SAE Aeronautical Standardization Program.

FIRST, the need for action must be realized – usually by an individual or a small group. This thought must then be transmitted to a larger group or an entire industry – and this larger group must be convinced of the need for action.

SECOND, the mechanics or organization structure for accomplishing a given result must be established, and

FINALLY, the execution of the plan and completion of the project must then be undertaken.

S FOR VICTORY ★ ★ ★

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The SAE Aeronautical Standardization Program has passed through stages one and two. It is now immersed in the third phase – the execution and administration of the work necessary to realize its objective, namely, the production of more airplanes in less time, and of a quality and type that can be more readily maintained and operated wherever and whenever required.

■ History

To understand and appreciate fully the overnight miracle of aeronautical standardization, it is necessary to turn back to the period in which the industry was relatively inactive in this field.

turn to page 25

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Transportation Industry Needs Better Replacement Parts Preference Ratings

■ **Chicago**

"What the motor transportation industry needs at the present time is a preference rating of A-1 or better on service parts and materials," declared Fred L. Faulkner, Armour & Co., at the Feb. 9 Transportation & Maintenance Meeting of the Chicago Section, held at the Knickerbocker Hotel. The meeting attracted over 250 members and guests, including ODT officials of the Regional and District offices, the regional director of the Interstate Commerce Commission and a group of nine Army officers of the Automotive Training School at Fort Sheridan, Ill.

"Not generally understood by operators is the use of priorities in connection with replacement parts," continued Mr. Faulkner, who is a member of the ODT Advisory Committee for the Chicago area, and chairman of the Truck Rationing Appeal Board for the States of Illinois, Indiana, and Michigan.

"If you place an order with a supplier for a given part, and the highest rating you can give is an A-10, and if the supplier has the part on hand and no orders carrying a higher priority have been received ahead of yours," he said, "then the supplier is required to fill your order, irrespective of statements that might be made to the contrary."

When priority assistance is needed by an operator, it can be obtained by filing Form No. PD-1a with the War Production Board Maintenance and Repair Section, explained Mr. Faulkner in his paper entitled "America's Trucks – Keep 'Em Rolling." Should an emergency condition exist, he advised operators to wire the Emergency Branch, Maintenance & Repair Section, WPB, Washington, furnishing complete information on the part needed, and the name and address of the supplier with whom the order has been placed.

Mr. Faulkner warned operators that strict observance of the following practices is imperative if tire failures are to be prevented: reduce speed; control overloads; control inflation pressure; match duals properly; maintain correct steering geometry; keep brakes in proper adjustment; repair bent rim flanges. He illustrated these points with a slide film of maintenance views. His advice to truck drivers is to start slowly, avoid bad spots in the road, avoid curb scuffing; drive slowly, approach and turn corners slowly, stop slowly.

Fred L. Faulkner, left, Chicago Section Feb. 9 speaker, shown with Technical Chairman Glenn W. Johnson

ODT Group Introduced

Technical Chairman Glenn W. Johnson, Bowman Dairy Co., introduced members of the ODT group which included Harry L. Gormley, regional manager of the Division of Motor Transport, ODT; Tom Snider, assistant regional ODT manager; Frank T. Corcoran, district manager, ODT; Paul Karns, assistant district manager, ODT; and Frank Purse, regional director, Bureau of Motor Carriers, Interstate Commerce Commission.

Among the group of Army transport officers from the Automotive Training School at Fort Sheridan were Col. E. H. Besse, commandant, Major Telford K. Thompson, Capt. Joseph A. McCoy, Capt. W. S. Stafford, Lt. A. C. Liddy, Lt. S. E. Levering, Lt. Jack Marietta, Lt. Robert R. Slater, and Lt. F. L. Beal. Col. Besse spoke briefly, paying tribute to SAE automotive engineering and the part which sound mechanical training and background are playing in the present world conflict.

SAE War Engineering Board Undertakes New Army Projects

POST WAR opportunities for service by the SAE War Engineering Board in industrial rehabilitation were visioned by Fred M. Zeder, vice-chairman of the Board, Chrysler Corp., guest at a recent meeting of the Board. Mr. Zeder emphasized also the high esteem in which the W.E.B. is held currently in Washington because of the practical and impartial character of its achievements.

Stimulated by first-hand reports of war vehicle maintenance problems in Africa, brought to the meeting by W.E.B. member Clyde Paton, Allison Division, General Motors Corp., who had just returned from that war theater, the Board has set up a special group to study dust problems. Ralph R. Teetor will be W.E.B. sponsor for the project, but will consult closely with Mr. Paton. Authority to carry on this project has been received from Brig.-Gen. G. M. Barnes with a request that all phases of the problem be brought together under the supervision of the W.E.B. This project will include an analysis and study of all dusting air cleaners with the idea of improving them, a development program of original design, and the establishment of a standard test procedure.

A W.E.B. committee on plastics with R. H. McCarroll, Ford Motor Co., as sponsor also was inaugurated.

Bofors Alloys Study

At this same meeting, W.E.B. swung into action on a study of possible reductions in use of critical materials in the Bofors 40 mm gun at the request of both Army and Navy Ordnance officials. E. H. Stilwill, Chrysler Corp. was named chairman of the subcommittee to do this job. Proof-testing of guns using alternate materials recommended by the W.E.B. committee was arranged for by both the Army and Navy.

Start Tests of Alternate Steels for Army Vehicles

With the completion of its study of practically every tank and combat vehicle built for the U. S. armed forces, the SAE War Engineering Board Iron and Steel Committee, chairmanned by W. P. Eddy, Jr., of Yellow Truck & Coach Mfg. Co., has placed at the disposal of the Ordnance Department nine progress reports containing recommendations for the use of alternate materials that will mean annual savings of millions of pounds each of chromium, nickel, and molybdenum. Ordnance officers have commended the committee highly for its thorough study. Directives have already been issued covering many of the recommended savings.

Testing 9400 Steels

The much more difficult task of testing and recommending substitutes of the new 9400 series steels for more critical materials in motor transport vehicles also has been undertaken by the Iron and Steel Committee under the direction of a subcommittee headed by F. E. McCleary, of Chrysler Corp. Motor transport vehicles are the individual design of each manufacturer and are purchased by the Army under manufacturers' guarantees. Therefore, testing of 9400 series steels also was held by the committee to be the responsibility of the respective manufacturers.

Representatives of a score of manufacturers of vehicles and of unit assemblies were brought together and from them was obtained a detailed list of their 9400 steel requirements for testing purposes. A composite list of these requirements by sizes and quantities for each company was taken to Washington by representatives of the Ordnance Department Technical Division and the Steel Section of the War Production Board, who will handle the production of the steel and the placing of it in warehouses earmarked for each company. Each manufacturer will follow its own known methods of proof-testing, thus short-circuiting the much longer plan originally suggested of building up a fleet of 1200 vehicles (100 each of 12 types) equipped with units containing untried and untested 9400 steels for field trials by the Army.

Develop Data on Use of Aluminum As War Material

To meet the problems of metallurgy and selection of aluminum and its alloys in the fabrication of war materiel which are developing daily, the SAE War Engineering Board has set up a new aluminum committee under the sponsorship of Louis Thoms, General Motors Corp.

Lacking the background of experience which exists in the field of iron and steel, it will be necessary for this committee to develop much of its experience as it goes along.

Accelerate Study of Protective Packing

One of the little known phases of the Ordnance Department's job of getting all types of mechanized materiel to U. S. armed forces overseas is that which comes under the head of preparation, preservation, and packing of engines, vehicles, and spare parts for overseas shipment. Every mechanized piece must be protected against the damaging effects of corrosion from salt air and salt water. And in this business of global warfare many new experiences have been met up with both by the Army and the manufacturers – even those who have been making export shipments for years.

Materiel is stored along the seaboard for weeks and months before shipment. Con-

A recent meeting of the SAE War Engineering Board Subcommittee on Preparation and Preservation of Engines, Vehicles, and Spare Parts for Storage and for Export Shipment. Left to right: G. C. Frank, White Motor Co.; R. M. Shaw, White Motor Co.; C. F. Walters, Chevrolet Motor Division, General Motors Corp.; Ted Kennedy, Dearborn Chemical Co.; R. D. Goodall, Davison Chemical Corp.; C. E. Heussner, Chrysler Corp., (chairman); Col. E. S. Van Deusen, director of motor transport vehicles, Tank-Automotive Center; Lt. W. J. Geggis, Development Engineering Section, Tank-Automotive Center; Major James A. Richardson, Ordnance Department; Dean A. Walters, Willys-Overland Motors, Inc.; J. W. Higgins, Packard Motor Car Co.; J. M. McCloud, Ford Motor Co.; M. Moschina, Ford Motor Co.; K. L. Raymond, General Motors Truck Corp.; J. M. Gauss, Studebaker Corp.

Prominent men who attended the season's outstanding meeting of the Washington Section to hear Gen. Hermon F. Safford speak on "Production Paces the United Nations Offensive." Seated, left to right: Brig.-Gen. Julian S. Hatcher, John A. C. Warner, secretary and general manager of the SAE, Gen. Hermon F. Safford, speaker of the evening, A. F. Campbell, chairman of the Section, George Hooper, Gen. G. M. Wells, chief of the Artillery Branch, Brig.-Gen. R. S. Chavin, Field Service Division, Ordnance. Standing, left to right: James A. Allen, vice-chairman of the Section, Brig.-Gen. H. R. Kutz, Curt Saurer, Gen. R. H. Somers, Army Ordnance Association, Col. E. E. MacMorland, Field Service

voys take longer to cross the ocean than ships did in peacetime. Cargoes are no longer carried entirely below decks, but are exposed to waves and spray. On the other side of the ocean the materiel again may be stored for weeks or months close to the seaboard, or in off-the-beaten-path combat zones. Boxes of spare parts may lie for days and weeks so close to the shore that the tides actually submerge the boxes.

By Ordnance Department directive a carefully selected subcommittee of the SAE War Engineering Board is working feverishly on every phase of this complex problem. Even an accelerated test program is being recommended that will tell the Army in a few days or weeks what it would take months to ascertain under normal conditions.

W.E.B. Aluminum Group in Action

Four subcommittees already are at work on problems facing the recently formed Aluminum Committee of the SAE War Engineering Board of which Louis Thoms, General Motors Corp., is sponsor and F. F. McCleary, Chrysler Corp., is chairman.

Named at the committee's organization meeting on Feb. 24, the four committees cover standardization of test pieces, effect of composition on physicial properties, die design, and inspection of raw material. Other topics will be studied later.

Members of the committee in addition to Mr. McCleary are: W. E. McCullough, Bohn Aluminum & Brass Corp. vice-chairman; H. S. Austin, Buick Motor Division, GMC; W. E. Boyd, Willys-Overland Motors, Inc.; R. Duff, Ford Motor Co.; H. F. Walker, Chevrolet Motor Division, GMC; P. P. Ziegler, Reynolds Metals Co.; Peter Harvey, Harvey Metals Co.; and T. Stey, Aluminum Co. of America.

Engineers Return From Winter Camp

SAE War Engineering Board subcommittee members who participated in cold operation tests with the Army in Northern Canada early this year (See *SAE Journal*, March, 1943, p. 23) have returned home. Testing ended some weeks ago, and this Camp Committee of Civilians has completed its field work for the time being, at least.

However, Army officers, who headed the automotive work at the Canadian Camp, have requested that the committee continue to function on the further development and improvement of the best practice for starting and operating all types of military vehicles in arctic temperatures. The Camp members report a vast difference between −40 F out in the open and −40 F in a cold room where it is possible to go outside and get warm every five minutes.

Plans are already being discussed for streamlining the winter camp program for next year. This year's work was new to everyone, Army and civilians alike.

Supply Task Stretches Over Land, Sea, Air Forces Of United Nations

▪ Washington

"The prized propagandist of the Axis, Dr. Goebbels, made the remark some time ago that Germany had taken seven years to mass a tremendous amount of war material which could never be equaled. How could it be expected that England or America could ever catch up to Germany? Yet, in one year, the United States has not only equaled Germany in the matter of production of war materials, but is now on the road to outstripping the combined efforts of Germany and her satellites," declared Brig.-Gen. Hermon F. Safford, Ordnance Chief, Production Service Branch, U. S. Army, to the members and guests of the Feb. 15 meeting of the Washington Section, which was held at the Mayflower Hotel. With an attendance of about 750, including many important military men, this meeting surpassed all previous meetings of the Section.

As an Ordnance officer, Gen. Safford confined himself to reporting the production of Ordnance, since he did not feel qualified to speak of the equally astounding record of production of other items of war.

"The Ordnance Department has been faced with an expansion program far more rapid than anything ever before known," he reported. From a rate of production of about $1,000,000 per month in May, 1940, the output has expanded to over $700,000,000 per month—an increase of about 70,000% in two short years.

"For years the Ordnance Department operated under a total annual appropriation of 7 to 10 million dollars," he said. "The production program for World War I in ordnance materiel alone amounted to slightly over four billion dollars. Today, orders total over 54 billion dollars.

"It must be remembered in this war that the United States is not supplying the U. S. Army alone," he pointed out. "It is supplying the land, sea and air forces of the United Nations," he continued, "as well as a considerable portion of their civilian requirements. Our materials must go to Russia to provide the essentials without which their present successful campaign would be impossible. They must go to China, to Africa, to England, to Australia, and the farthermost corners of the world. This has placed a demand upon our resources never before dreamed of. It has brought about the necessity for the most careful measures of conservation and substitution to permit the greatest use of the available critical materials." (Excerpts from Gen. Safford's paper appear on p. 19 of this issue.)

Engine Conditioning Urgent In Maximum Efficiency Aim

▪ Southern California

In the past, abnormal wear was a predominating factor in the operation of automobiles. Today, it is up to every driver to reduce this to a minimum in order for normal wear to be controlled through proper gasoline rationing, cautioned Carl Abell, district engineer, the Ethyl Corp., before the Southern California Section meeting of Jan. 22. In recent years, he pointed out, engines have been made for maximum efficiency at speeds considerably above 35 mph. As suggestions for changes which could be made to improve efficiency in the

turn to page 45

AIRCRAFT-ENGINE SUBDIVISION

Serving with Chairman C. E. MINES (page 21) are these committeemen who are responsible for Aircraft-Engine Standards and Engine Recommended Practices. A total of 79 engineers, representing the major aircraft-engine manufacturers, are members of the 16 committees of the Aircraft-Engine Subdivision. Close liaison is maintained with the Army and Navy in all SAE standards work.

L. to R.: VAL CRONSTEDT, Pratt & Whitney Aircraft; R. W. YOUNG, Wright Aeronautical Corp., vice-chairman; R. M. HAZEN, Allison Division, vice-chairman; S. K. HOFFMAN, Lycoming Division, vice-chairman; A. T. GREGORY, Ranger Aircraft Engines; J. W. KINNUCAN, Continental Motors Corp.; L. A. MAJNERI, Warner Aircraft Corp.; and C. T. DOMAN, Air-cooled Motors

continued from page 21

As in most such cases, the present SAE Aeronautical Standardization Program is the result of an individual's ideas and foresight. America owes a great debt to the farsighted viewpoint of Arthur Nutt of Wright Aeronautical Corp. It was he who, at personal sacrifice, aroused interest in aeronautical standardization. He planned, promoted, and guided this program through its initial days – and he is still guiding it with a masterful touch.

Visiting Europe in 1940, he saw and evaluated German results from standardization of aircraft and aircraft accessories. He returned to the United States convinced of the need for accelerating aircraft standardization efforts. He took steps to convince the American aeronautical industry of the importance of a program which would produce for America results already accruing to Germany, but which, through inherent flexibility, would give America a narrow edge of superiority.

In the summer of 1940, the SAE aeronautical standards program started to shift into high gear. The Eastern and Western Divisions of the NASC were born during this same period. Inevitably, problems of organization arose. Fortunately, technical and diplomatic differences of opinion were thrashed out around a conference table in the Office of Production Management at Washington on Feb. 28, 1941. Definite agreement was reached that an accelerated program of aeronautical standardization should be started, and that responsibilities should be assigned as follows:

Aeronautical Board – Responsible agent for the Army Air Forces, Navy Bureau of Aeronautics, and Government activities in the field of aeronautical standardization.

National Aircraft Standards Committee – Responsible for standards governing airframes structure, and installations of powerplants and accessories.

Society of Automotive Engineers, Inc. – Responsible for dimensional standards for aircraft engines, propellers, parts, accessories, equipment, and for all aeronautical material standards.

■ Organization

The SAE, accepting its part of this assignment, established the Aeronautics Division of the SAE General Standards Committee in March, 1941. A chart of this organization appears as Fig. 1. Mr. Nutt was appointed chairman, with Hall Hibbard of Lockheed Aircraft Corp. as vice-chairman for aircraft, and L. S. Hobbs of Pratt & Whitney Aircraft Division as vice-chairman for aircraft engines.

Initial work developed the need for subdivisions, the chairmen of which became members of the Aeronautics Division. The Aircraft-Engine Subdivision originally was

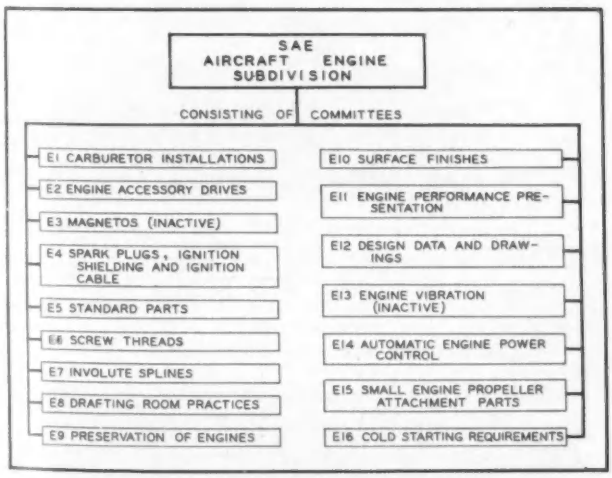


Fig. 3 – Organization chart of SAE Aircraft-Engine Subdivision

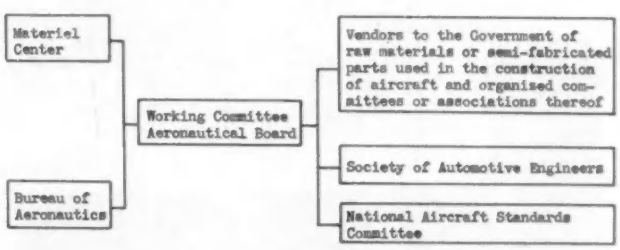
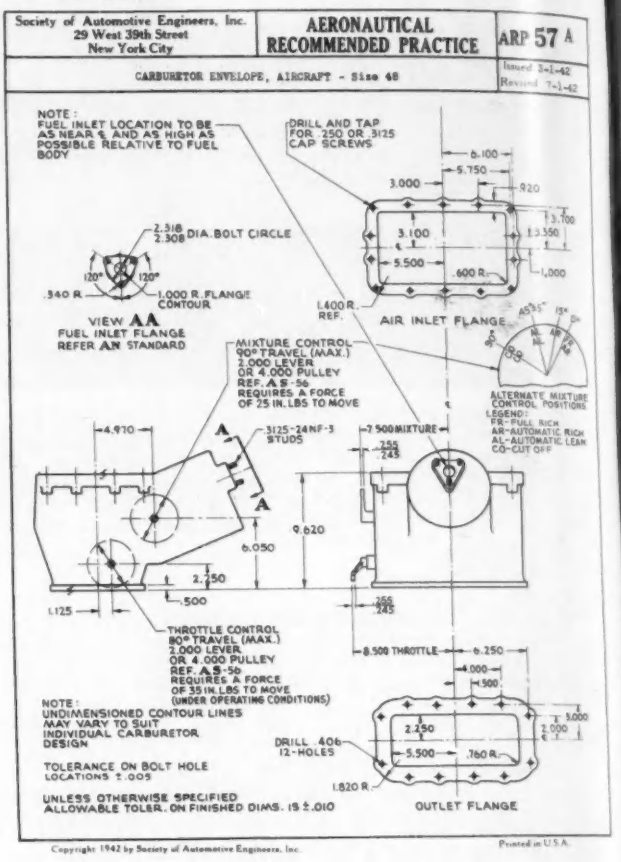

Materiel Center
Bureau of Aeronautics
Working Committee Aeronautical Board
Vendors to the Government of raw materials or semi-fabricated parts used in the construction of aircraft and organized committees or associations thereof
Society of Automotive Engineers
National Aircraft Standards Committee

Fig. 2 – Relationship between WCAB, the Military Services and industry

Fig. 4 – Example of SAE Aeronautical Recommended Practice (ARP)


Society of Automotive Engineers, Inc.
29 West 39th Street
New York City
AERONAUTICAL RECOMMENDED PRACTICE
ARP 57 A
CARBURETOR ENVELOPE, AIRCRAFT - Size 48
NOTE: FUEL INLET LOCATION TO BE AS NEAR S. AND AS HIGH AS POSSIBLE RELATIVE TO FUEL BODY
DRILL AND TAP FOR .250 OR .3125 CAP SCREWS
VIEW AA
FUEL INLET FLANGE REFER AN STANDARD
MIXTURE CONTROL 90° TRAVEL (MAX.) 2.000 LEVER OR 4.000 PULLEY REF. AS-56 REQUIRES A FORCE OF 25 IN. LBS TO MOVE
AIR INLET FLANGE
ALTERNATE MIXTURE CONTROL POSITIONS
LEGEND: FR-FULL RICH AR-AUTOMATIC RICH AL-AUTOMATIC LEAN CO-CUT OFF
3125-24NF-3 STUDS
THROTTLE CONTROL 80° TRAVEL (MAX.) 2.000 LEVER OR 4.000 PULLEY REF. AS-56 REQUIRES A FORCE OF 35 IN. LBS TO MOVE (UNDER OPERATING CONDITIONS)
NOTE: UNDIMENSIONED CONTOUR LINES MAY VARY TO SUIT INDIVIDUAL CARBURETOR DESIGN
TOLERANCE ON BOLT HOLE LOCATIONS ±.005
UNLESS OTHERWISE SPECIFIED ALLOWABLE TOLER. ON FINISHED DIMS. IS ±.010
OUTLET FLANGE
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directed by Val Cronstedt of Pratt & Whitney, who recently was succeeded by C. E. Mines of the Jacobs Aircraft Engine Co. Erle Martin of Hamilton Standard Propellers is chairman of the Propeller Subdivision; William Littlewood of American Airlines is chairman of the Aircraft Accessories and Equipment Subdivision; and J. B. Johnson of the Army Air Forces Materiel Center is chairman of the Aircraft Materials and Processes Coordinating Subdivision.

In the establishment of this organization, operating policies have been based upon the experience of the SAE's 37 years of standardization effort. These fundamentals must be appreciated to understand how and why the operating methods of SAE Committees differ from those of other standardizing bodies. These policies are:

1. The detail work involved in the development of satisfactory standards must be handled by small and efficient committees composed of engineering experts on the subjects concerned.

2. These individuals must be selected for their known qualifications as technical experts in specific fields and not on the basis of their company connections.

3. The members of the committees must be selected from a sufficient number of companies to give an adequate cross-section opinion and understanding of the problem.

4. Each committee is responsible for coordinating all proposed standards with interested and qualified companies before these proposals are submitted to the Aeronautics Division for final approval prior to publication.

The functions of the committees are clearly defined as:

1. To develop all necessary standards where none exist and where there is a demonstrated need for such standards.

2. To develop improved standards where existing Government and commercial standards do not agree or require revision. (In executing this function, it is essential that parts produced to either the Government or the industry standard be interchangeable even though the two standards may differ in such details as method of dimensioning.)

3. To analyze and to discuss with the Government all new standards or revisions proposed by the Government.

Both SAE and NASC, as representing industry, confine the activities of their standardization committees to these three functions. Thorough exposition of the manner in which the Working Committee of the Aeronautical Board coordinates its standardization work with industry through

E-1, CARBURETOR INSTALLATIONS: Top left: F. J. WIEGAND, Wright Aeronautical Corp., chairman; lower, L. to R.: M. E. CHANDLER, Chandler-Evans Corp.; M. J. KITTLER, Holley Carburetor Co.; R. C. PALMER, Pratt & Whitney Aircraft; H. G. TARTER, Bendix-Stromberg Division; and M. A. TRISLER, Allison Division

E-2, ENGINE ACCESSORY DRIVES: L. to R.: G. N. COLE, Pratt & Whitney Aircraft, chairman; GUSTAF CARVELLI, Wright Aeronautical Corp.; WALTER HURLEMAN, Jacobs Aircraft Engine Co.; C. J. McDOWALL, Allison Division; and WILLIAM WADDELL, Lycoming Division

E-3, MAGNETOS (INACTIVE): L. to R.: E. K. VON MERTENS, Pratt & Whitney Aircraft, chairman; GUSTAF CARVELLI, Wright Aeronautical Corp.; D. W. RANDOLPH, Packard Motor Car Co.; and M. A. TRISLER, Allison Division

E-4, SPARK PLUGS, IGNITION SHIELDING AND IGNITION CABLE: L. to R.: A. L. BEALL, Wright Aeronautical Corp., chairman; J. L. ARTHUR, Allison Division; A. T. GREGORY, Ranger Aircraft Engines; E. K. VON MERTENS, Pratt & Whitney Aircraft; and B. CLEMENTS, Wright Aeronautical Corp.

SAE and NASC appears in an article by Col. D. G. Lingle, Army member, and Capt. G. A. Seitz, former Navy member, of the WCAB[1]. Fig. 2, reproduced from that article, illustrates the working relationship between the WCAB, the Military Services, and industry.

The SAE Aeronautical Standardization Program has been concerned particularly with nomenclature, dimensional uniformity to promote interchangeability, materials and products specifications, and, to a degree, with methods of test or inspection.

At this point it may serve the ends of discretion to answer frankly the inevitable question as to what consideration SAE standards committees give to patented items. It is SAE policy in formulating SAE standards and recommended practices neither to consider nor to investigate patents, but to advise those intending to use standards and practices to make their own investigations and arrangements for avoiding liability for infringement.

■ Aircraft-Engine Subdivision

Organization of the four subdivisions of the SAE Aeronautics Division has resulted in a division of labor which enables each subdivision to function in its own field through its own committees. Fig. 3 diagrams the Aircraft-Engine Subdivision and its 16 committees, and further shows that practically all items – at least all types of items involved in the design and production of aircraft engines – come within the interest and scope of some committee. Assignments already have been completed by a few committees which, while currently inactive, are kept intact to be called upon when necessary. Two of the reasons for keeping these committees intact are: (1) to be sure that the currently issued standards on the subject in which the particular committee is interested will be kept up to date and not become obsolete; and (2) to assist in the coordination of industry recommendations on proposed new or revised AN Aeronautical Specifications developed by the WCAB.

To select for specific mention the accomplishments of any one committee or subdivision is to risk being unintentionally unfair to other groups, yet brevity so demands. One example is the development of carburetor envelopes by Committee E-1 through cooperation of manufacturers of airframes, engines, and carburetors. Fig. 4 shows SAE Aeronautical Recommended Practice designated as ARP 57A, "Carburetor Envelope, Aircraft – Size 48." Manufacturers of engines now know the standard sizes and dimensions involved, the location and dimensions of air inlet and outlet flanges, and the fuel inlet locations. Carburetor manufacturers know the external space limitations within which designs must be kept. Airplane manufacturers know the external dimensions which must be cleared in power-plant installations, the locations of throttle and mixture controls, and the travel of the mixture control.

The advantages of these standardized dimensions are obvious. Uncounted man-hours are saved by each of these manufacturers in developing new designs. On the battle-front, a carburetor can be removed from a damaged plane and installed in another with the assurance of an exact fit, regardless of what firm manufactured the engines, carburetors, or airplanes. If the tactical operations of the enemy should reach this country and the plant of any one manufacturer were bombed out of commission, the products of other manufacturers could be used. Because products are built to the same envelope dimensions, production of war planes can continue without interruption.

Committee E-9 on Engine Preservation has undertaken pioneering work in the field of shipping and storage. Only a few years ago nearly as many hours were needed to uncrate, clean, and prepare an aircraft engine for installation as it took to assemble it. New processes, equipment,

[1] See *SAE Journal*, November, 1942, pp. 32-33, 66-80: "Army-Navy Aeronautical Standardization," by Col. D. G. Lingle and Capt. G. A. Seitz.

E-5, STANDARD PARTS: L. to R.: G. N. COLE, Pratt & Whitney Aircraft, chairman; GUSTAF CARVELLI, Wright Aeronautical Corp.; WALTER HURLEMAN, Jacobs Aircraft Engine Co.; C. J. McDOWALL, Allison Division; and WILLIAM WADDELL, Lycoming Division

E-6, SCREW THREADS: L. to R.: GUSTAF CARVELLI, Wright Aeronautical Corp., chairman; R. G. ANDERSON, Aluminum Co. of America; C. J. McDOWALL, Allison Division; and J. G. PERRIN, Pratt & Whitney Aircraft

E-7, INVOLUTE SPLINES: Top R.: GUSTAF CARVELLI, Wright Aeronautical Corp., chairman; L to R.: N. L. COBB, Fellows Gear Shaper Co.; J. L. GOLDTHWAITE, Allison Division; C. J. McDOWALL, Allison Division; J. OSPLACK, Vinco Corp.; and J. G. PERRIN, Pratt & Whitney Aircraft

E-8, DRAFTING ROOM PRACTICES: Top R.: J. G. PERRIN, Pratt & Whitney Aircraft, chairman; L. to R.: H. W. EPLER, Lycoming Division; R. S. KELLOGG, Packard Motor Car Co.; C. R. REYNOLDS, Allison Division; P. V. RICHARDS, Wright Aeronautical Corp.; and J. G. SCHWEIGER, Ranger Aircraft Engines

and material developed by Committee E-9 and accepted as standard by Government and industry have reduced the job to minutes.

Another project completed by Committee E-10, Surface Finishes, was the development of Aeronautical Standard, AS 107, containing standard definitions for terms used in referring to quality of surface finish and the machine operations required to produce these finishes. Of basic importance in this standard, however, is the fact that standard symbols are specified for designating surface qualities. These symbols designate the roughness as expressed in micro-inches, the waviness expressed as a physical measurement, and the lay or direction of tool marks, sometimes spoken of as the grain of the surface. In the development of this proposed standard, coordination with the NASC was accomplished to insure that the symbols specified therein would be in agreement with that group's proposals. The NASC has a parallel standard for surface finish containing the same standard symbols and emphasizing the additional information applicable to the airframes industry, whereas the SAE standard, AS 107, contains additional information of particular interest to the aircraft-engine, propeller, and accessory manufacturers.

A major accomplishment was the development of a manual of Standard Aircraft-Engine Drafting Room Practice. This is the work of Committee E-8, Drafting Room Practices, and is based upon actual practices of present-day drafting and design departments. The first edition, which was largely a skeleton version containing only those items that were found to be non-controversial at the start of the committee's operation, was issued in November, 1941. As a result of continued efforts of the committee and of a year's experience with this manual, a revised and expanded edition was issued in November, 1942. It is anticipated that the continued efforts of this committee can be reflected by the addition of new pages to this manual rather than by the immediate revision of existing pages. This manual includes standard practice on such items as symbols for designating types of materials, types and widths of lines to be used on drawings, sizes of drawings, location of drawing title block, methods of folding drawings, dimensioning of production drawings, as well as extensive data referring to standards notes and definitions, abbreviations, and so forth, on drawings. This manual has been of vital importance in training new personnel for immediate productive employment in aircraft-engine and accessory plants during the current emergency.

This manual emphasizes those practices which are particularly applicable to production drawings of aircraft engines, propellers, and accessories, and other close-tolerance machining operations. A standard manual which would be applicable to the entire aircraft industry would be very desirable. Since many of the basic practices of a drafting room followed by the airframes industry and the engine, propeller, and accessory industry are identical, it is believed that a single manual is desirable in order to avoid the necessity for two separate manuals to be issued, the basic principles of which would have to be duplicated in both manuals.

E-9, PRESERVATION OF ENGINES: Top R.: A. P. AYERS, Pratt & Whitney Aircraft, chairman; L. to R.: R. L. HEATH, Allison Division; H. A. LOCKWOOD, Chandler-Evans Corp.; B. L. SHARON, Lycoming Division; M. H. YOUNG, Wright Aeronautical Corp.; and R. D. GOODALL, Davison Chemical Corp.

■ Aircraft Propeller Subdivision

Organization of the Aircraft Propeller Subdivision and its committees appears in Fig. 5. Since propeller design is in a continuing stage of transition, efforts have been directed towards the development of appropriate aeronautical recommended practices tending to hold new designs within certain dimensional channels regardless of the manufacturing plant in which they may originate.

For instance, at the request of the Government, the three separate companies which have been developing dual rotation propellers were brought together through SAE Committee P-5 on Dual Rotation Shafts, to develop a mutually satisfactory dimensional standard for such propeller shafts. This group then got together with the engine manufacturers through SAE Committee E-2, Engine Accessory Drives, of the Aircraft-Engine Subdivision, and complete agreement of the engine manufacturers and propeller

E-10, SURFACE FINISHES: L. to R.: GUSTAF CARVELLI, Wright Aeronautical Corp., chairman; GILBERT BARNES, Pratt & Whitney Aircraft; CLAYTON LEWIS, Chrysler Corp.; W. C. OESTRIKE, Allison Division; and E. H. SMITH, Packard Motor Car Co.

E-11, ENGINE PERFORMANCE PRESENTATION: L. to R.; E. F. PIERCE, Wright Aeronautical Corp., chairman; C. F. BACHLE, Continental Aviation & Engrg. Corp.; D. S. HERSEY, Pratt & Whitney Aircraft; W. R. HOPKINS, Lycoming Division; and T. S. McCRAE, Allison Division

E-12, DESIGN, DATA & DRAWINGS: L. to R.: B. OSBORN, Wright Aeronautical Corp., chairman; GEORGE BOSCO, JR., Ranger Aircraft Engines; B. CANE, Lycoming Division; J. B. IMRIE, Pratt & Whitney Aircraft; and W. M. TYLER, Allison Division

manufacturers has recently been reached on a proposed aeronautical standard. This proposed standard is still in the "restricted" category and is to be turned over to the Working Committee of the Aeronautical Board very shortly for their use as the basis for an AN Standard for Government procurement purposes. Any new designs which may be developed by any company will thus have the advantage of these established standards as guides, thereby simplifying and expediting the processes of design and development. Of even more and basic importance, users of new propellers will know that dual rotation propellers of given sizes are readily interchangeable.

■ Accessories and Equipment Subdivision

Some of the more complex technical problems arising in aeronautical standardization are to be found in the work of the Aircraft Accessories and Equipment Subdivision. Fig. 6 shows the plan of organization of this subdivision. It cooperates closely with the NASC, which is concerned with the standardizing of accessory *systems* and *installations* of items of equipment standardized by SAE. Cooperation is informal through the day-to-day contacts of the engineers in both groups. Formal coordination is assured through exchange of memberships. This system of interlocking memberships is shown in Fig. 7. For example, the SAE Hydraulic Equipment Committee, A-6, includes a representative of the NASC Hydraulic Systems and Installation Committee. Likewise, the NASC group has a member representing the SAE committee.

In addition to developing appropriate SAE industrial standards, the committees of this particular subdivision have been active in coordinating industry comments on proposed AN Aeronautical Standards and Specifications. Normal procedure is for the WCAB to submit copies of tentative drafts to SAE. These are circulated within industry for comment by a stated date. The comments are reviewed by committee members and a coordinated summary report is forwarded to the Aeronautical Board. Subsequently, the comments are considered by technical experts of the Army and Navy, and the proposed specifications are reconsidered or revised. With few exceptions, the Military Services have incorporated the recommendations of industry in final drafts.

Several SAE Aeronautical Information Reports have also been prepared by the committees of this subdivision.

E-13, ENGINE VIBRATION (INACTIVE): L. to R.: O. V. MONTIETH, Allison Division, chairman; ROBERT A. COLE, Wright Aeronautical Corp.; W. S. FAUST, Lycoming Division; and GEORGE WILLIAMS, Pratt & Whitney Aircraft. R. W. WINSLOW, Continental Aviation & Engrg. Corp., picture unavailable

E-14, AUTOMATIC ENGINE POWER CONTROL: L. to R.: WAYNE CANNON, Wright Aeronautical Corp., chairman; JOHN DOLZA, Allison Division; and SAM FOX, Pratt & Whitney Aircraft

E-15, SMALL ENGINE PROPELLER ATTACHMENT PARTS: L. to R.: J. P. FLANNERY, Aircooled Motors Corp.; GORDON L. FREEDMAN, Freedman-Burnham Engrg. Corp.; P. B. MARTIN, Lycoming Division; and HAROLD R. UHRICH, Sensenich Bros. THOMAS JACKSON, Continental Motors & Engrg. Corp., chairman, picture unavailable

■ Materials and Processes Coordinating Subdivision

The organization of the Aircraft Materials and Processes Coordinating Subdivision, shown in Fig. 8, provides for three committees undertaking highly specialized work in rather wide fields. The committees are composed of ranking metallurgists and materials engineers from a sufficiently large group of companies and from the Army and Navy to ensure a thoroughly competent and technical viewpoint. The specifications developed by this group include processes, non-metallics such as plastics and synthetic rubber, aluminum, magnesium and copper alloys, and steel products.

The operations of this group in developing Aeronautical Material Specifications (AMS) constitute an excellent example of the democratic way of approaching technical problems. In the preparation of this series of specifications, consideration is given to the advice and recommendations of all those qualified and interested, including the suppliers of materials. As a result, the entire aircraft industry can procure material under generally available standard specifications, reducing the number of different materials to be produced, obviating the necessity for individual companies to prepare their own specifications for procurement purposes, simplifying the whole procurement operation, and eliminating confusion, mistakes, and misunderstandings.

To differentiate between SAE Aeronautical Material Specifications and the well-known SAE standard steel compositions, it is necessary to understand two distinctively peculiar characteristics of AMS:

1. AMS are complete procurement specifications which

E-16, COLD STARTING REQUIREMENTS: L. to R.: C. R. PATON, Allison Division, chairman; R. E. JOHNSON, Wright Aeronautical Corp.; B. J. RYDER, Lycoming Division; and W. H. SPRENKLE, Pratt & Whitney Aircraft. MAX EPPS, Ranger Aircraft Engines, picture unavailable

AIRCRAFT ACCESSORIES & EQUIPMENT SUBDIVISION

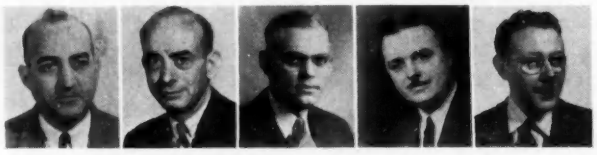
Serving with Chairman WILLIAM LITTLEWOOD (page 21) are these committeemen who are responsible for the work of 11 committees, with a total membership of 62 engineers, representing leading manufacturers of aeronautical accessories and equipment.

Above, L. to R.: M. E. CHANDLER, Chandler-Evans Corp.; W. W. DAVIES, United Air Lines Transport Corp.; DAVID GREGG, Eclipse Aviation Div.; J. J. HILT, Young Radiator Co.; C. HOLLERITH, Hayes Industries, Inc.; H. M. HUCKE, RCA Mfg. Co., Inc.; C. V. JOHNSON, Bendix Products Division; PAUL KOLLSMAN, Kollsman Instrument Division; W. C. LAWRENCE, American Airlines, Inc.

Below, L. to R.: ERLE MARTIN, Hamilton Standard Propellers; R. L. McBRIEN, United Air Lines Transport Corp.; C. W. PEPPERMAN, Lewis Engrg. Co.; J. M. ROTH, Pump Engrg. Service Corp.; C. C. SHANGRAW, Eclipse Aviation Div.; T. R. THOREN, Thompson Products, Inc.; JACK VITOL, Civil Aeronautics Administration; and J. F. WALLACE, Cleveland Pneumatic Tool Co. HAROLD ADAMS, Douglas Aircraft Co., picture unavailable

A-1, AIRCRAFT PUMPS: Top: DAVID GREGG, Eclipse Aviation Div., chairman; L. to R.: R. C. BERGH (NASC Liaison), Republic Aviation Corp.; CHARLES S. METSGER, Eclipse Aviation Div.; J. M. ROTH, Pump Engrg. Service Corp.; LON STOREY, JR., Lockheed Aircraft Corp.; and T. R. THOREN, Thompson Products Co.

A-2, AIRCRAFT ELECTRICAL EQUIPMENT: L. to R.: C. C. SHANGRAW, Eclipse Aviation Div., chairman; WARREN BOUGHTON (NASC Liaison), Douglas Aircraft Co.; R. W. GEMMELL, Westinghouse Electric Mfg. Co.; E. G. HAVEN, General Electric Co.; and E. E. MINOR, Glenn L. Martin Co.



A-3, AIRCRAFT VALVES AND FLEXIBLE HOSE ASSEMBLIES: L. to R.: J. M. ROTH, Pump Engrg. Service Corp., chairman; R. C. BERGH (NASC Liaison), Republic Aviation Corp.; R. H. DAVIES, Parker Appliance Co.; L. J. HENDERSON, The Weatherhead Co.; and WILLIAM M. WHITE, Douglas Aircraft Co.

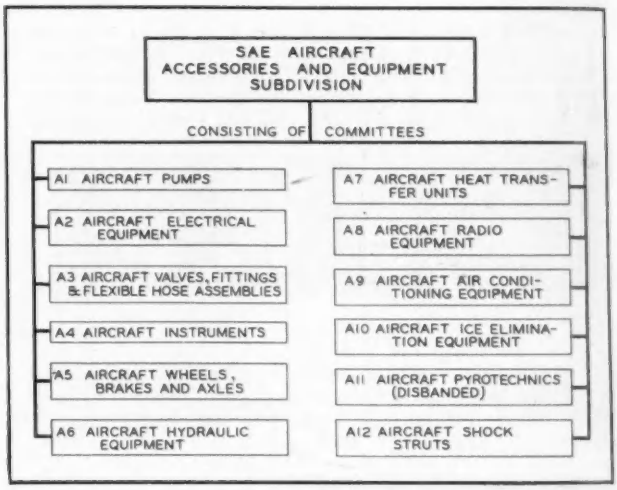

SAE AIRCRAFT ACCESSORIES AND EQUIPMENT SUBDIVISION
CONSISTING OF COMMITTEES
A1 AIRCRAFT PUMPS
A2 AIRCRAFT ELECTRICAL EQUIPMENT
A3 AIRCRAFT VALVES, FITTINGS & FLEXIBLE HOSE ASSEMBLIES
A4 AIRCRAFT INSTRUMENTS
A5 AIRCRAFT WHEELS, BRAKES AND AXLES
A6 AIRCRAFT HYDRAULIC EQUIPMENT
A7 AIRCRAFT HEAT TRANSFER UNITS
A8 AIRCRAFT RADIO EQUIPMENT
A9 AIRCRAFT AIR CONDITIONING EQUIPMENT
A10 AIRCRAFT ICE ELIMINATION EQUIPMENT
A11 AIRCRAFT PYROTECHNICS (DISBANDED)
A12 AIRCRAFT SHOCK STRUTS

Fig. 6 – Organization chart of SAE Aircraft Accessories and Equipment Subdivision

may be used as the basis for acceptance or rejection of parts and materials purchased.

2. AMS materials composition limits and other requirements, being designed to meet the specific and specialized needs of the aircraft industry, may be more rigid than those satisfactory for general purposes.

To retain the benefits of standardization, chemical and physical compositions of materials covered by AMS are coordinated as far as possible with existing SAE or other accepted general standards for similar materials. In cases which require more restrictive limits of acceptable composition, effort is made to keep within boundaries established for basic SAE standard compositions.

A-4, AIRCRAFT INSTRUMENTS: Upper left: C. W. PEPPERMAN, Lewis Engrg. Co., chairman. Below, L. to R.: H. A. GIBB (NASC Liaison), Vultee Aircraft, Inc.; GEORGE LEWTHWAITE, Pioneer Instrument Co.; W. A. PETRASEK, American Airlines, Inc.; L. N. SWISHER, Sperry Gyroscope Co., Inc., and P. F. WEBER, Kollsman Instrument Division

A-5, AIRCRAFT WHEELS, BRAKES, and AXLES: L. to R.: C. HOLLERITH, Hayes Industries, Inc., chairman; J. P. BRACHT, B. F. Goodrich Co.; ERIC DUDLEY (NASC Liaison), Curtiss Airplane Division; C. V. JOHNSON, Bendix Products Division; and PARRY KELLER, Goodyear Tire & Rubber Co.

A-6, AIRCRAFT HYDRAULIC EQUIPMENT: L. to R.: HOWARD FIELD (NASC Liaison), North American Aviation; HARRY KUPIEC, Glenn L. Martin Co.; ED MERIPOL, Lockheed Aircraft Corp.; Lower, L. to R.: R. E. MIDDLETON, Aircraft Accessories Corp.; J. W. OVERBEKE, Simmonds Aerocessories; D. L. STORY, United Aircraft Products Corp.; W. C. TRAUTMAN, Bendix Aviation, Ltd.; and H. E. WEBB, Adel Precision Products. HAROLD ADAMS, Douglas Aircraft Co., chairman, picture unavailable

A-7 AIRCRAFT HEAT TRANSFER UNITS: L. to R.: J. J. HILT, Young Radiator Co., chairman; A. A. BROWN, Pratt & Whitney Aircraft; K. A. BROWNE, Wright Aeronautical Corp.; Lower, L. to R.: W. H. GEDDES, United Aircraft Products Corp.; G. W. McENTIRE, AiResearch Mfg. Co.; L. T. MILLER (NASC Liaison), Glenn L. Martin Co.; L. P. SAUNDERS, Harrison Radiator Division; and R. A. WOLF, Bell Aircraft Corp.

While, obviously, an involved procedure necessitating consideration of many points of view, reconciliation of conflicting opinions, and extensive detail work, the development of material specifications from the time need arises until copies are distributed throughout the industry is a fast and efficient operation. Importance of these specifications to the aircraft industry and the high regard in which they are held, are indicated by the widespread interests which is generated by announcement of a committee meeting to consider new specifications or revisions, and by the demand for copies. Setting the date for a meeting appears to be the industry's signal to seek by telephone, telegraph, air mail, and messenger complete information as to when and where the meeting will be held and what subjects will be discussed. The process is repeated upon announcement that a new specification or revision has been completed.

Publication and distribution of AMS with sufficient rapidity and volume to meet the industry's needs have become problems in themselves. Nature of these problems is indicated by Fig. 9, which shows the number of specifications prepared and the rapidity with which new and

A-8, AIRCRAFT RADIO EQUIPMENT: L. to R.: H. M. HUCKE, RCA Mfg. Co., Inc.; W. L. BERRY (NASC Liaison), Hughes Aircraft Co.; STANLEY IRWIN, American Airlines, Inc.; R. R. SMITH, Glenn L. Martin Co.; and C. G. FICK, General Electric Co.

A-9, AIRCRAFT AIR CONDITIONING EQUIPMENT: Top, L.: W. W. DAVIES, United Air Lines Transport Corp., chairman; L. to R.: JOSEPH JERGER, Curtiss-Wright Corp.; W. B. KLEMPERER, Douglas Aircraft Co.; V. C. LUNDQUIST, Northwest Airlines, Inc.; P. C. SCOFIELD (NASC Liaison), Lockheed Aircraft Corp.; and R. C. SYLVANDER, Pioneer Instrument Division

A-10, AIRCRAFT ICE ELIMINATION EQUIPMENT: Top, L. to R.: R. L. McBRIEN, United Air Lines Transport Corp., chairman; H. R. ALEXANDER, Vultee Aircraft, Inc.; Lower, L. to R.: W. D. CRAIG, JR. (NASC Liaison), Grumman Aircraft Engrg. Corp.; W. H. HUNTER, B. F. Goodrich Co.; K. O. LARSON, Northwest Airlines, Inc.; R. B. PARK, Hamilton Standard Propellers; and M. L. TAYLOR, Eclipse Aviation Division

A-12, AIRCRAFT SHOCK STRUTS: C. V. JOHNSON, Bendix Products Division, chairman
(Committee being organized)

revised specifications periodically are issued. Significantly, this chart shows that many specifications must be revised within one year after initial preparation. This work of revision parallels almost exactly the amount of work involved in developing new specifications.

Fig. 10 indicates the acceptance value of AMS within the aircraft industry, as well as the growing demand. Two years ago, slightly less than 500 customers were in the market for these specifications. Currently, more than 3200 must be notified immediately whenever any new or revised specifications are published. Many users do not await announcements, but have placed standing orders for blanket deliveries of quantity lots of the approved specifications immediately upon publication.

More than 1,500,000 single copies of these specifications have been delivered to date. In January, 1943, more than 61,000 copies were distributed within one week.

Such comprehensive coordination of technical viewpoint from qualified aircraft people permits a purchaser to benefit from the consulting advice of not only the 35 committee members, but also of the metallurgists of the material suppliers for the cost of a single specification.

Popularity of these specifications can be ascribed to factors other than their prevailing price of 2¢ per copy. The big demand in that single week in January may be traced to the fact of the discovery by the industry that 24 specifications covering synthetic rubber had been approved and published Dec. 1, 1942, and that they were the only satisfactory specifications for these materials available. Incidentally, these synthetic rubber specifications, like all others of the AMS series, were prepared through the cooperative efforts of synthetic rubber producers and compounders, the manufacturing industry, the Government, and the users.

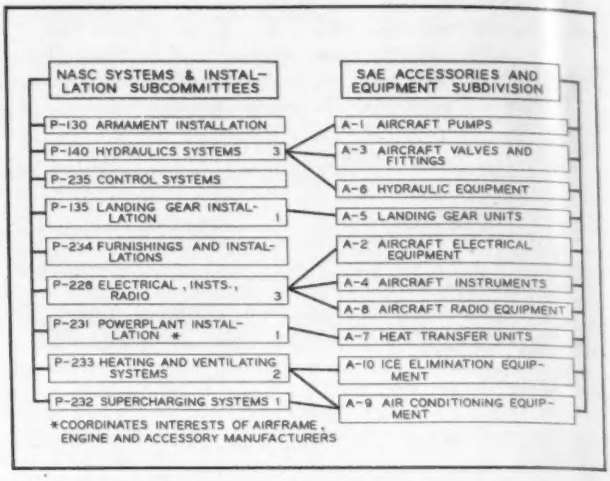

NASC SYSTEMS & INSTALLATION SUBCOMMITTEES
SAE ACCESSORIES AND EQUIPMENT SUBDIVISION
P-130 ARMAMENT INSTALLATION
P-140 HYDRAULICS SYSTEMS 3
P-235 CONTROL SYSTEMS
P-135 LANDING GEAR INSTALLATION 1
P-234 FURNISHINGS AND INSTALLATIONS
P-228 ELECTRICAL, INSTS., RADIO 3
P-231 POWERPLANT INSTALLATION * 1
P-233 HEATING AND VENTILATING SYSTEMS 2
P-232 SUPERCHARGING SYSTEMS 1
A-1 AIRCRAFT PUMPS
A-3 AIRCRAFT VALVES AND FITTINGS
A-6 HYDRAULIC EQUIPMENT
A-5 LANDING GEAR UNITS
A-2 AIRCRAFT ELECTRICAL EQUIPMENT
A-4 AIRCRAFT INSTRUMENTS
A-8 AIRCRAFT RADIO EQUIPMENT
A-7 HEAT TRANSFER UNITS
A-10 ICE ELIMINATION EQUIPMENT
A-9 AIR CONDITIONING EQUIPMENT
*COORDINATES INTERESTS OF AIRFRAME, ENGINE AND ACCESSORY MANUFACTURERS

Fig. 7 – Liaison between NASC and SAE subcommittees

Recently developed are 16 specifications covering alternate aeronautical steels conforming with compositions recommended by the WPB Technical Advisory Committee for Aeronautical Steels. These compositions have been designated by some groups within the industry as "NE Steels."

The thoroughly democratic process of developing an Aeronautical Material Specification merits somewhat detailed explanation beyond the illustration in Fig. 11. Normally, the request for a specification originates with a member of one of the committees, who files his recommendations with the chairman of the appropriate group. Decision to undertake the project is reached either by correspondence or at committee meetings, and the work of preparing a draft is assigned to a qualified committee member.

AIRCRAFT-ENGINE PROPELLER SUBDIVISION

Serving with ERLE MARTIN (page 21) are these committee members who are guiding the Propeller Standards Program. They are, L. to R.: Mr. MARTIN, chairman; G. W. BRADY, Propeller Division, Curtiss-Wright Corp.; C. S. MacNEIL, Aeroproducts Division, General Motors Corp., and F. E. WEICK, Engineering & Research Corp. Their eight committees, with a total of 16 members, are shown on the next page.

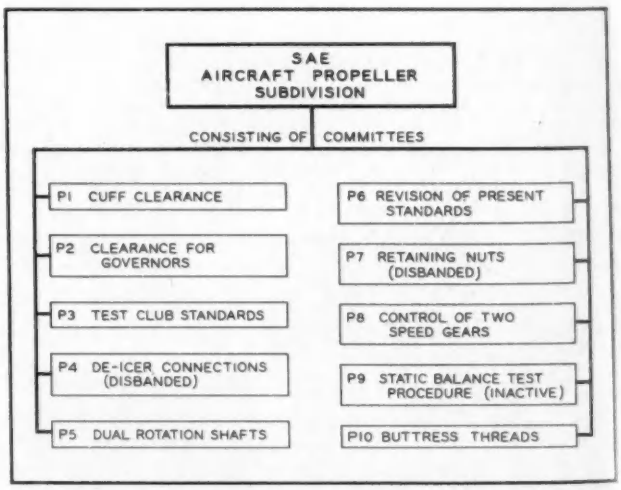


Fig. 5 – Organization chart of SAE Aircraft Propeller Subdivision

The draft is forwarded to SAE offices with instructions for its circulation among committee members and outside vendors. This draft is reproduced by SAE and is put into circulation accompanied by a questionnaire which permits committee members to approve, disapprove, or to waive their vote. Customarily, several comments on this first proposed draft are received. These comments are summarized by the SAE headquarters staff and placed on the agenda of the next meeting of the committees. Decisions being reached as to the action to be taken on each comment, a revised draft of the specifications is prepared either by a committee member or by the SAE staff for circulation among the seven members of the SAE Aeronautics Division. If the resulting letter ballot indicates unanimous approval, the SAE prepares a final copy of the specification for publication and sale.

■ Types of SAE Standards

The specifications and standards that result from the committees' efforts, as outlined herein, are classified into four different groups according to their particular characteristics.

1. AERONAUTICAL MATERIAL SPECIFICATIONS (AMS) – This identification is used for standard specifications for materials and processes conforming with *currently established engineering practice.*

2. AERONAUTICAL STANDARDS (AS) – Dimensional standards based on *sound established engineering practice,* or for other performance specifications that do not fall in the category of AMS.

3. AERONAUTICAL RECOMMENDED PRACTICES (ARP) – Dimensional and performance specifications based on *sound engineering principles* and intended as *guides* towards standard engineering practice.

P-1, CUFF CLEARANCE: L. to R.: G. W. BRADY, Curtiss-Wright Corp., chairman; T. E. DOHERTY, Hamilton Standard Propellers; W. L. GREENE, Engineering and Research Corp.; and JOSEPH STUART, III, Aeroproducts Division

P-2, CLEARANCE FOR GOVERNORS: L. to R.: T. E. DOHERTY, Hamilton Standard Propellers, chairman; and J. I. HAMILTON, Curtiss-Wright Corp. W. J. WHEELER, Electrical Engineering & Mfg. Corp., picture unavailable

P-3, TEST CLUB STANDARDS: L. to R.: F. E. WEICK, Engineering and Research Corp., chairman; W. D. SNELL, Propeller Division, Curtiss-Wright Corp.; J. C. MORSE, Civil Aeronautics Administration; and H. R. UHRICH, Sensenich Bros.

P-5, DUAL ROTATION SHAFTS: L. to R.: R. P. LAMBECK, Hamilton Standard Propellers, chairman; C. W. CHILLSON, Curtiss-Wright Corp., Propeller Division; W. L. GREENE, Engineering and Research Corp.; and T. B. MARTIN, Aeroproducts Division

P-6, REVISION OF PRESENT STANDARDS: L. to R.: R. P. LAMBECK, Hamilton Standard Propellers, chairman; THOMAS BARISH Engineering and Research Corp.; WILLIAM HAZLETT, Aeroproducts Division; and J. H. SHEETS, Curtiss-Wright Corp., Propeller Division

P-8, CONTROL OF 2-SPEED GEARS: L. to R.: R. P. LAMBECK, Hamilton Standard Propellers, chairman; C. W. CHILLSON, Curtiss-Wright Corp., Propeller Division; and J. F. HAINES, Aeroproducts Division

P-9, STATIC BALANCE TEST PROCEDURE: L. to R.: J. H. SHEETS, Curtiss-Wright Corp., Propeller Division, chairman; R. P. LAMBECK, Hamilton Standard Propellers; and CLIFFORD L. MUZZEY, Aeroproducts Division

P-10, BUTTRESS THREADS: L. to R.: C. S. MacNEIL, Aeroproducts Division, chairman; W. L. GREENE, Engineering and Research Corp.; and M. E. CUSHMAN, Curtiss-Wright Corp., Propeller Division

AIRCRAFT MATERIALS & PROCESSES COORDINATING SUBDIVISION

Under the chairmanship of J. B. JOHNSON, (L., above, and page 21) is the administrative group in charge of the three large materials specifications committees which are shown on the two following pages. To the right of Mr. JOHNSON are L. D. BONHAM, Lockheed Aircraft Corp.; B. CLEMENTS, Wright Aeronautical Corp., and N. E. WOLDMAN, Eclipse Pioneer Division, Bendix Aviation Corp.

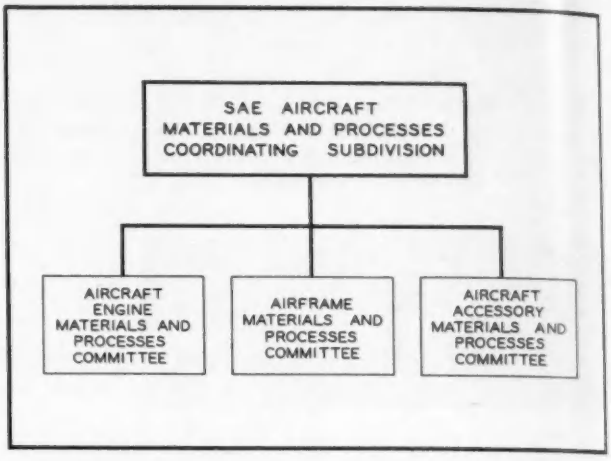

SAE AIRCRAFT MATERIALS AND PROCESSES COORDINATING SUBDIVISION
AIRCRAFT ENGINE MATERIALS AND PROCESSES COMMITTEE
AIRFRAME MATERIALS AND PROCESSES COMMITTEE
AIRCRAFT ACCESSORY MATERIALS AND PROCESSES COMMITTEE

Fig. 8 – Organization chart of SAE Aircraft Materials and Processes Coordinating Subdivision

4. AERONAUTICAL INFORMATION REPORTS (AIR) – Engineering data, usually bearing a close relationship to Aeronautical Standards or Aeronautical Recommended Practices, that are of sufficient value to warrant publication, but whose nature does not warrant their classification as standards or recommended practices.

Aeronautical Standards, Aeronautical Recommended Practices, and Aeronautical Information Reports are identified numerically, the numbers being assigned when a specific subject is ready for consideration. In the case of Aeronautical Material Specifications, identification numbers comprise a series of four digits with certain blocks reserved for particular types of specifications. For instance, the 2000 series of numbers is assigned to specifications covering processes, and the 3000 series to non-metallic materials.

Specifications covering metals and their alloys are identified by related series of numbers, such as 4000 to 4200 for aluminum and aluminum alloys, 4300 to 4400 for magnesium alloys, and 4500 to 4900 for copper alloys. Carbon steels, corrosion-resistant steels and low-alloy steels are covered by the 5000 to 6900 series. A few Aeronautical Material Specifications for semi-fabricated parts developed before the Aeronautical Standards series was originated are included in the 7000 series. These specifications cover a few parts and assemblies such as cotter pins, rivets, lock washers, and piston rings.

■ Summary

This work of preparing standards, practices, reports, and specifications, so helpful and valuable to the aircraft in-

Aircraft-Engine Materials & Processes Committee

Top row, L. to R.: B. CLEMENTS, Wright Aeronautical Corp., chairman; and L. D. BONHAM, Lockheed Aircraft Corp. Second row, L. to R.: C. E. CARRIGAN, Ranger Aircraft Engines; P. V. FARAGHER, Aluminum Co. of America; F. P. GILLIGAN, Henry Souther Engrg. Co.; W. H. GRAVES, Packard Motor Car Co.

■ ■

Bottom row, L. to R.: A. W. F. GREEN, Pratt & Whitney Aircraft; R. L. HEATH, Allison Division; J. N. HUFF, American Propeller Co.; F. B. JOHNSON, Materiel Center, U. S. Army Air Forces; J. S. KLOCK, Hamilton Standard Propellers; H. J. NOBLE, Jacobs Aircraft Engine Co.; C. L. STEVENS, Ford Motor Co.; N. E. WOLDMAN, Eclipse Pioneer Division; and R. D. ZONGE, Lycoming Division. Pictures of R. R. MOORE, Naval Aircraft Factory, and LT.-COM. R. C. HALL, Bureau of Aeronautics, U. S. Navy, were unavailable

Airframes Materials & Processes Committee

Above, L. to R.: L. D. BONHAM, Lockheed Aircraft Corp., chairman; PETER ALTMAN, Vultee Aircraft, Inc.; R. W. AYER, Fleetwings, Inc.; A. F. BARNARD, Vultee Aircraft, Inc. (succeeded by R. B. STRINGFIELD); B. CLEMENTS, Wright Aeronautical Corp.; J. F. CRAMER, Boeing Airplane Co.; ERIC DUDLEY (NASC Liaison), Curtiss Airplane Division; R. B. GRAY, Glenn L. Martin Co. Below, L. to R.: H. D. HOEKSTRA, Civil Aeronautics Administration; J. B. JOHNSON, Materiel Center, U. S. Army Air Forces; ROY A. MILLER, Consolidated Aircraft Corp.; H. G. RUNDE, Vought-Sikorsky Aircraft; L. P. SPALDING, North American Aviation, Inc.; R. A. WEBSTER, Douglas Aircraft Co.; J. W. WELTY, Bell Aircraft Co.; and T. E. PIPER, Northrop Aircraft, Inc. Pictures of R. R. MOORE, Naval Aircraft Factory; JOSEPH PERINA, Republic Aviation Corp., and LT.-COM. R. C. HALL, Bureau of Aeronautics, U. S. Navy, were unavailable

Aircraft Accessory Materials & Processes Committee

ACCESSORY MATERIALS AND PROCESSES COMMITTEE: L. to R.: N. E. WOLDMAN, Eclipse Pioneer Division, chairman; H. D. BUBB, JR., Thompson Products, Inc.; C. E. CARRIGAN, Ranger Aircraft Engines; J. B. JOHNSON, Materiel Center, U. S. Army Air Forces; W. B. LEYDA, A. O. Smith Corp.; L. P. SPALDING, North American Aviation; ROBERT WARING, Sperry Gyroscope Co.; and ARTHUR VOLZ, Bendix Products Division. Pictures of R. R. MOORE, Naval Aircraft Factory, and LT.-COM. R. C. HALL, Bureau of Aeronautics, U. S. Navy, were unavailable

dustry, represents the voluntary and cooperative efforts of many engineers, both in Government and in private industry, and the interest and financial support of many companies. It cannot be emphasized too strongly the degree to which companies are cooperating with each other in this work and the degree to which the Government and

SAE Material Specs Get New OK by Army, Navy

SAE Aeronautical Material Specifications are given new and official recognition by the Aeronautical Board, as a result of a conference of representatives from industry, the Army Air Forces, the Bureau of Aeronautics, the Aircraft Production Board, and the Working Committee of the Aeronautical Board, held Feb. 4 in Washington.

As a consequence of a directive issued as AN Aeronautical Bulletin No. 143, increased responsibility has been placed on the shoulders of the members of the SAE Aircraft Materials and Processes Committees, since it is required that standard AMS be used in lieu of individual company specifications whenever suitable AMS are available. . . .

The Aeronautical Board has also agreed to participate more actively in the development of SAE specifications by having representatives at AMS committee meetings. In addition, the Government and the airframes manufacturers recommended, and the four chairmen of the SAE Materials and Processes groups agreed, that more attention should be given to presenting recommendations to the Aeronautical Board for changes in AN material and process specifications, so as to bring them into technical agreement with the AMS.

According to ANA Bulletin 143, the policy developed establishes six classes of material and process specifications and standards, to be used by aircraft engine, airframe, and aircraft accessory manufacturers in the following order of preference:

1. AN Aeronautical Specifications and Standards.
2. Federal Specifications.
3. Army Air Forces or U. S. Army Specifications for use by the Army Air Forces; various Navy Specifications for use by the Navy Bureau of Aeronautics.
4. Army Air Forces or U. S. Army Specifications for use by the Navy; various Navy Specifications for use by the Army Air Forces.
5. Industry specifications prepared by organizations such as the SAE or the NASC.
6. Individual company specifications and standards.

Engine manufacturers, the directive states, are permitted to continue to use AMS on *all* their drawings. They need not refer to AN specifications, provided, of course, the individual AMS is satisfactory to the Government. Propeller and accessory manufacturers may likewise continue to use AMS without further question, except as governed by any particular AN specifications applicable to that equipment that in a few cases may specify AN materials.

Airframe manufacturers, on the other hand, are required to refer to the Government specifications (see 1 to 4 above) whenever appropriate specifications are available. If none are in existence, then they may use AMS without further request to the Government. They may also use AMS or company specifications when undue delay would otherwise result, provided the materials so obtained produce parts of equal quality. However, even then, the materials so produced may be subjected, at the option of the Government, to examination for performance with the reference Government specifications.

At the conference, it was decided an AN bulletin should be published that lists acceptable AMS, NASC, and other non-Government standards. There was also discussion as to the value of publishing another bulletin listing all the approved Government specifications included in the four classes mentioned above.

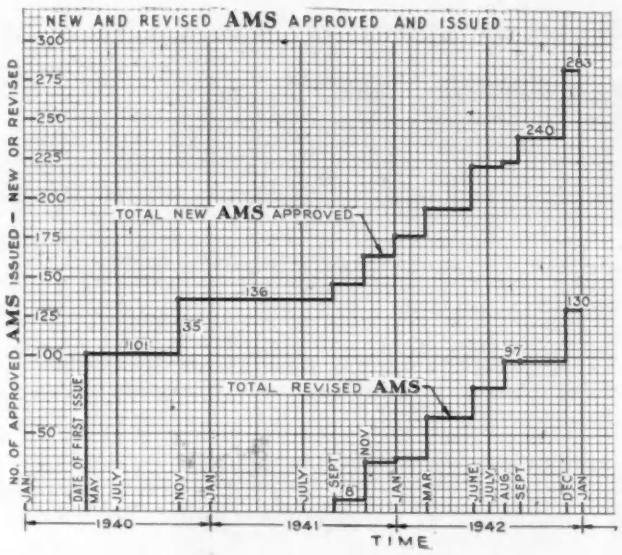


Fig. 9 – Growth of AMS – number of approved specifications issued

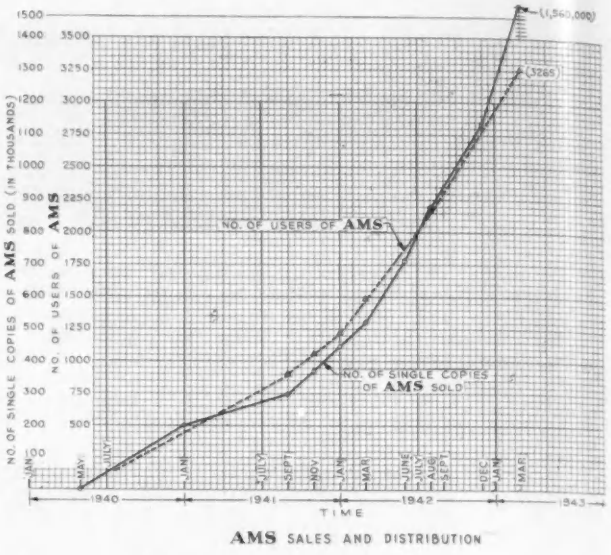


Fig. 10 – Growth of AMS – sales and distribution

industry are cooperating with each other. Hardly a day passes in the offices of the WCAB that does not include a formal or informal meeting between representatives of the Army and Navy and of private industry. This is a very healthy condition and it is hoped this will continue henceforth.

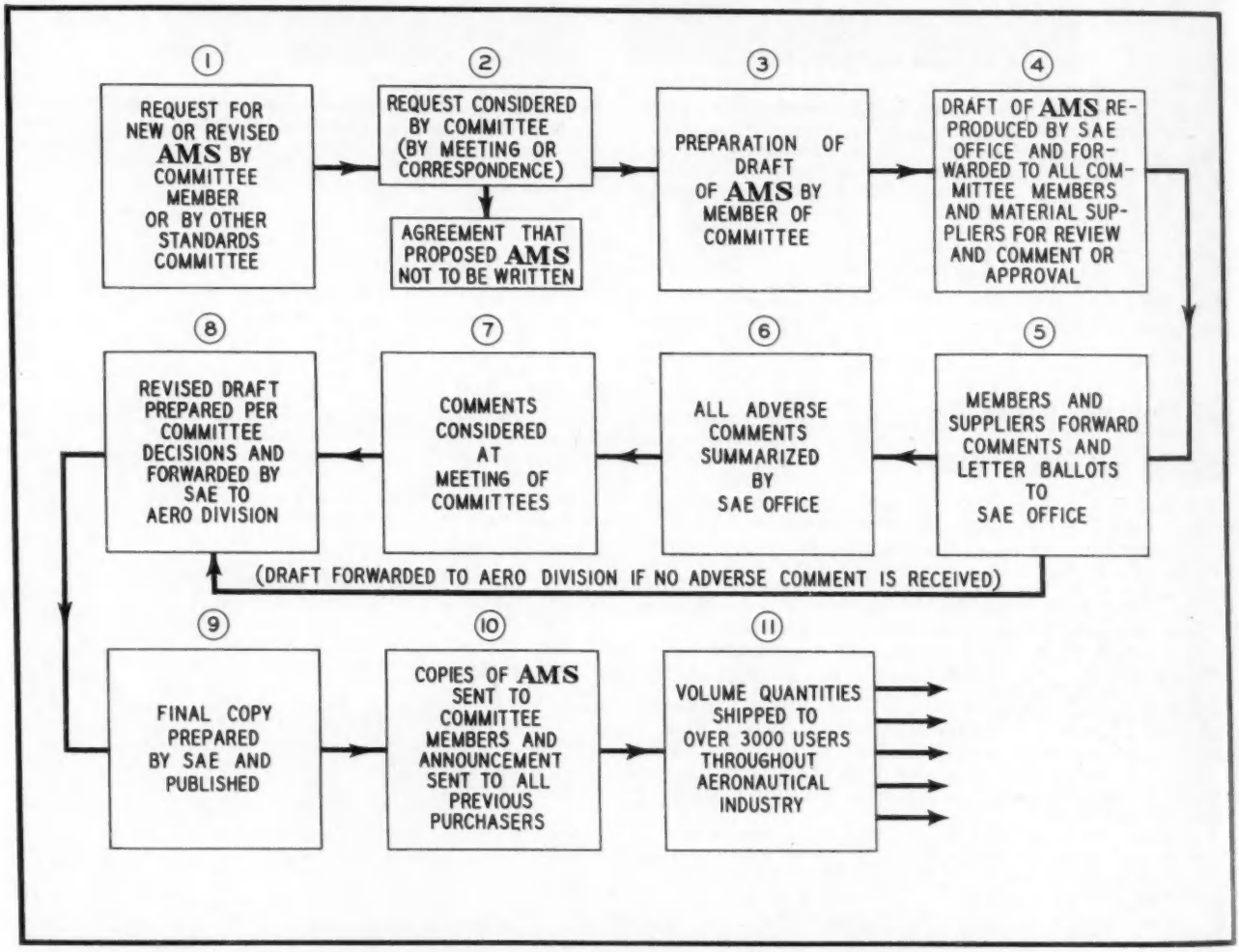

1
REQUEST FOR NEW OR REVISED AMS BY COMMITTEE MEMBER OR BY OTHER STANDARDS COMMITTEE
2
REQUEST CONSIDERED BY COMMITTEE (BY MEETING OR CORRESPONDENCE)
AGREEMENT THAT PROPOSED AMS NOT TO BE WRITTEN
3
PREPARATION OF DRAFT OF AMS BY MEMBER OF COMMITTEE
4
DRAFT OF AMS REPRODUCED BY SAE OFFICE AND FORWARDED TO ALL COMMITTEE MEMBERS AND MATERIAL SUPPLIERS FOR REVIEW AND COMMENT OR APPROVAL
5
MEMBERS AND SUPPLIERS FORWARD COMMENTS AND LETTER BALLOTS TO SAE OFFICE
6
ALL ADVERSE COMMENTS SUMMARIZED BY SAE OFFICE
7
COMMENTS CONSIDERED AT MEETING OF COMMITTEES
8
REVISED DRAFT PREPARED PER COMMITTEE DECISIONS AND FORWARDED BY SAE TO AERO DIVISION
(DRAFT FORWARDED TO AERO DIVISION IF NO ADVERSE COMMENT IS RECEIVED)
9
FINAL COPY PREPARED BY SAE AND PUBLISHED
10
COPIES OF AMS SENT TO COMMITTEE MEMBERS AND ANNOUNCEMENT SENT TO ALL PREVIOUS PURCHASERS
11
VOLUME QUANTITIES SHIPPED TO OVER 3000 USERS THROUGHOUT AERONAUTICAL INDUSTRY

Fig. 11 – Steps in the development of an Aeronautical Material Specification (AMS)

New Responsibilities Faced By Engineers In CMP Set Up

WPB's Controlled Materials Plan is due to become the nation's No. 1 engineering headache.

Essentially an accounting procedure, CMP provides a control over the distribution of materials. But recent CMP amendments tightening controls over productive facilities, and assuring production of critical common components, are of vital concern to production engineers. Recent changes provide:

- That no person shall accept an allotment for the manufacture of a Class A product, as defined in the CMP Regulations, regardless of the accompanying preference rating, if he does not expect to be able to fulfill the related authorized production schedule, subject to unexpected contingencies and to any period of grace which may be specified by the person who offers the allotment and the authorized schedule.
- That no person who has accepted an authorized production schedule for a Class A product shall thereafter accept any delivery order (except an emergency order rated AAA) for any Class A, Class B or other product manufactured by him, regardless of the accompanying rating or allotment number or symbol, unless he expects that, subject to unexpected contingencies, he can fill the order without interfering with the fulfillment of such previously accepted production schedule.
- That a person making Class B products to fill unrated or low rated orders must accept higher rated orders to the extent, and subject to the exceptions, provided in Priorities Regulation No. 1, unless he is also making a Class A product on an authorized production schedule, with which such higher rated orders would interfere contrary to above mentioned provisions.

Engineers will be called upon, in connection with the operations of CMP, to maintain authorized production schedules in conformity with these scheduling provisions. Estimated production rates and plant capacities for items which are subjects of allocations on authorized production schedules will be their responsibility.

One major task facing engineers under the amended CMP regulations is making certain that operators do not accept orders on authorized production schedules, which they will be unable to fulfill. Unforeseen contingencies, of course, exempt operators from penalties under the Criminal Code, but failure to reject orders when it cannot be reasonably expected to fulfill them, will result in severe penalties.

A new element is being injected into CMP, under specific scheduling orders which have recently been issued. Under these orders, authorized production schedules applicable under CMP may be established with respect to specific items without reference to bills of materials and allotments. L-264, for example, requires that production and delivery schedules for rectifier tubes must be submitted to WPB for approval.

These schedules must be worked out three months in advance, and such schedules, when approved, shall become authorized CMP production schedules, despite the fact that there might be some disagreement between the schedule as approved by WPB and the authorized schedule under CMP. Scores of such orders are now being drafted.

Subcontracting

SWPC Chief Swings Into Vigorous Action

TOUGHEST of letters written in Washington in recent months was Col. Robert W. Johnson's law-quoting epistle to the secretaries of War and Navy, the chairman of the Maritime Commission, and director of the Treasury Procurement.

Subject:

Subcontracting.

Under the "Congressional mandate" of the Smaller War Plants Act, of which the former chief of the New York Army Ordnance District is the administrator, the letter of March 9 demands to know of 252 major arms contractors:

- The number and dollar volume of prime and subcontracts,
- Methods being used by these corporations to increase subcontracting, and
- Methods used to insure that subcontracting is being done on a fair and equitable basis.

Deadline:

April 7.

On Dec. 15, 1942, Under-secretaries Patterson and Forrestal and WPB Chairman Donald Nelson wrote the procurement agencies for this type of information. Reminding the recipients of this fact, the Colonel noted: "Field reports fail to indicate any effective response."

Historically, the Army and Navy have been super-sensitive about their relationships with Congress. Even in these days of astronomical appropriations, military liaison with Capitol Hill is maintained, reactions of the press are constantly analyzed, and "favorable, unfavorable, and neutral" editorials are painstakingly charted.

Inter-Allied

Aeronautical Standards To Be Coordinated

SAE aeronautical standards were praised by British aeronautical experts at a conference on standardization in Washington March 1, when arrangements were made to coordinate aircraft, engine, and accessory standards with those of Great Britain, Canada, and Australia.

Purpose of the conference was to establish means of achieving interchangeability of aircraft parts made in the United States and in England, Canada, and Australia.

It was agreed that the British Air Commission in Washington would serve as the clearing house on inter-allied aeronautical standards. The SAE Aeronautical Division and other national standardizing groups will be notified of projects of most interest to British, Canadian, and Australian military authorities and aircraft builders.

Among the projects of most interest to our Allies were standardization of propeller hubs, wheels, tires, generators, starters, pumps, and other major accessories. These are among the scopes of important standard work being done by SAE committees. (See p. 20.)

One of the British spokesmen was enthusiastic about the work done on standard methods and specifications for materials for the preservation of engines (E-9, see p. 29). He said it was "one of the outstanding developments" he had seen during his two-month inspection trip here.

Those attending the conference were Sir Roy Fedden, head of the British Aircraft Mission; Air Vice-Marshall R. O. Jones; H. B. Howard; Russell Tiltman, and Ian Duncan, representing the British Government.

Canada was represented by Group Capt. A. F. Britton and Squadron Leader C. H. Skelton.

Australian officials were Wing-Com. J. W. Black, Flight-Lt. T. G. Macintosh, and Flight-Lt. K. K. DeCean.

Col. D. G. Lingle, AAF, and Lt.-Com. A. M. Blamphin, USNR, of the Working Committee, Aeronautical Board, represented the Army and Navy, respectively.

Other conferees were Edward Warner, for-

mer SAE president, member of C.A.B.; A. A. Vollnecke, chief, Aircraft Engineering Division, CAA; James P. Murray, president, Aeronautical Chamber of Commerce of America; Frank N. Flemming, secretary, and Irving H. Taylor, general manager, ACCA; Eric Dudley, national chairman, and T. P. Hearne, National Aircraft Standards Committee; C. E. Mines, chairman, SAE Engine Standards Subdivision (see p. 25); J. D. Redding, SAE staff representative on aeronautical projects; Cyril Ainsworth, assistant secretary, American Standards Association; J. T. Gray, manager, technical department, and E. W. Norris, ACCA.

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Rubber

"Tough Months Ahead," Director Jeffers Says

RUBBER shortages are going to make the months ahead tough, William M. Jeffers told the *SAE Journal*, but said: "Now we know the answers to some of our problems."

Cautious about making predictions, the rubber director said he wasn't impressed with controversies between proponents of petroleum or alcohol to feed the four Government butadiene plants. Total U. S. requirements would take only about ½% of domestic petroleum production, it has been estimated.

It is expected that the alcohol butadiene plant at Institute, W. Va., operated by Carbon & Carbide Corp., and the petroleum plant at Baton Rouge, operated by Standard Oil of Louisiana, will be in full production soon. Early reports are good. Two other 20,000 ton plants are under construction.

WPB has chosen sites for five new alcohol plants, but recently cancelled two building projects for refinery conversion to save critical materials.

Reasons for caution are that synthetic rubber is hardly out of the laboratory stage and production is unpredictable, and those in charge of the rubber program today believe too much talking has been done already.

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Export Scheduling On Quarterly Basis

Advance information upon which to schedule exports of all goods will be available to manufacturers through a plan set up by the State Department, foreign purchasing commissions, and the Board of Economic Warfare.

The new system, involving advance programing of shipments, will more closely coordinate procurement and shipping. Quarterly forms will disclose the dollar value and tonnages, and essential goods will have precedence.

BEW recently disclosed that large amounts of shipments had been piled in warehouses and on docks because of the scramble to get shipping space after the goods had been delivered to the ports of embarkation.

Steels:

Alloys Are Key to Aircraft Program

CRUX of the nation's aircraft production program is not aluminum, but alloy steels. This is the consensus of civilian and military experts who are trying to meet the announced 1943 program of 104,000 aircraft of all required sizes and types, and the discussed 150,000 units for 1944.

More than a year ago the Aircraft Branch of WPB established a group of warehouses for aircraft materials from coast to coast. There are now 26.

Recently, Charles E. Wilson, WPB's production boss, checked the inventory reports of major aircraft factories, and agreed with his aircraft staff that many were excessive.

Reasons:

- Aircraft manufacturers, to insure no shortages of materials, tended to keep materials rolling in on general principles. They did not notify mills to cease or delay shipments when production rates slowed down.
- Mills waited until enough orders for a given steel alloy amounted to a commercial heat.

Now aircraft manufacturers are pooling their orders for alloy steels, and mills are pooling these so that heats can be melted and shipped more often.

Nearly 19 tons of steel are required for the large 4-engine bombers of the Flying Fortress type, and more than 13 tons of steels are needed to build the medium 2-engine bombers (pre-machining weights).

Facts:

Year	Units Produced or Projected	Est. Gain in Av. W't. Over Year Before	Number of Companies	Number of Plants	Dollar Volume (Billions)
1941	19,000			59	1¾
1942	48,000	200%	61	81	4½
1943	104,000	100%	64	100	9*
1944	150,000 (if needed)				

*Backlogs.

Significant are the increased weights. With an estimated increase in the unit weight of 300% for 1943 production as compared with that of 1941, the nation's material problem continues to be critical. Neither the Services nor aircraft manufacturers are prone to lower the strength of airframe, engine, or accessory materials, although wider use of plastics, plywood, and less critical materials has been accomplished in large amounts.

Thus the aircraft program will continue to drain other military and civilian uses.

If it had not been for the sweeping conservation steps made by Army Ordnance and the Navy to date, the aircraft program announced by the President would not have been possible of attainment. Other conservation programs, although totaling less, have proved to be of tremendous value.

WPB Tightened

Recent Promotions Give Wilson Closer Control

WPB got its first bolt-tightening since the recent dismissal of Ferdinand Eberstadt when Chairman Donald M. Nelson appointed:

- Ralph J. Cordiner, formerly director general for war production scheduling, a vice-chairman of WPB and special assistant to Executive Vice-Chairman Charles E. Wilson, General Electric president.
- J. A. Krug, a veteran executive of the NDAC, OPM, and WPB, a vice-chairman of WPB in charge of materials distribution, and chairman of WPB's Requirements Committee. He retains his Office of War Utilities directorship;
- Donald D. Davis is the new vice-chairman for operations, succeeding
- Curtis E. Calder, who was named executive assistant to Mr. Wilson.
- William L. Batt continues a vice-chairman of WPB. An SAE member, he is the American member of the Combined Raw Materials Board of which Mr. Nelson is chairman.
- Col. Robert W. Johnson retains his rank as deputy chairman (see "Subcontracting," p. 37).

Thus Mr. Wilson remains firmly in the driver's seat of WPB. His position is critical:

- The top operations man, and target for Congressional and other attacks;
- Surrounded by men of vigor who are apt to disagree on methods – and who are prone to sound off with vehemence;
- Responsible to Mr. Nelson, the President, and the nation for the smooth flow of materials to war plants. Close observers held that Mr. Krug's elevation to vice-chairmanship (this outranks deputy chairmanship in WPB) strengthens Mr. Wilson's hand in administering the lumbrous Controlled Materials Plan (see "New Responsibilities Faced by Engineers, etc.," p. 37).

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NACA To Work Around the Clock

The three laboratories of the National Advisory Committee for Aeronautics will soon swing to a three-shift basis, and employment will be raised from about 2700 to 4400 within 18 months, SAE Member George Lewis, director of research for NACA, told a congressional committee recently.

Wind tunnel facilities at Langley Field, Va., and at Moffett Field, Sunnyvale, Calif., are being worked around the clock. The new engine laboratory at Cleveland is nearing completion, and already has 600 employees at work.

Thirty universities are working on 80-odd projects, and important work is being done for NACA by the National Bureau of Standards to improve the performance of American fighting aircraft. These range from research on materials and processes to new design. The House granted the requested appropriation of $19,454,500 to NACA for the 1944 fiscal year.

Scheduling

New WPB Order M-293 Issued

VISUALIZING the dual role of war production, General Scheduling Order M-293 (Feb. 26) has been issued by WPB to:

Provide better facilities for fabricating critical components.

The Controlled Materials Plan is designed to get raw materials to the right place at the right time. M-293 is counted upon to get the needed components built.

Background of this general scheduling order were six similar orders aimed at assuring that enough of certain products was produced in the war effort. The new order makes few actual changes in either the X or Y classes of products.

Until amended, M-293 requires that manufacturers of the products specified below shall file forms showing production capacity, and orders unfilled, received, shipped, canceled and scheduled:

Crankshafts;
Diesel engines;
Gasoline engines;
Pumps;
Electric motor controls;
Pressure vessels;
Circuit breakers;
Radio test equipment, and
CO_2 Extinguishers.

On and after April 1, manufacturers of these products must deliver these items only in accordance with the schedules they file, notwithstanding any preference rating or other orders of WPB.

Many an end-product has been held up from shipment because of the lack of components, WPB reported.

The big push for high production in December further threw the flow of components out of gear, and production during January, February and March suffered thereby.

WPB expects this general scheduling order to get the components back on a schedule, one of its spokesmen told the *SAE Journal*.

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To Control U.S. Vehicle Mileage

President Roosevelt has ordered Federal department heads to name a mileage administrator to reduce mileage of Government-owned vehicles by at least 40%. He urged pooling of vehicles used by Government officials and employees.

Government mileage administrators have been appointed in 40 states and D. C.

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Gen. Young Upped

Brig.-Gen. Charles D. Young, USA, retired, has been named deputy director of the Office of Defense Transportation by Joseph B. Eastman. He was formerly an assistant director. During World War I Gen. Young resigned from the Pennsylvania Railroad to serve with the Army Transport Corps, and again left the railroad to serve in the Army.

Report of SAE-ODT Transportation & Maintenance Committee was reprinted by the Government Printing Office at the request of the Office of Defense Transportation, where copies may be obtained free of charge. This report was also published in the January issue, SAE Journal

Engine Production Under WPB Controls

CONTROLLED production of all internal-combustion engines, except those for aircraft and motorcycles, is provided for in two WPB limitation orders (L-293, Feb. 26, and L-254, March 4).

The Automotive Division has been analyzing the order boards of engine builders, and found that whereas some companies had backlogs of 28 to 30 months, others were operating far below capacity and still other facilities are not being used at all.

Certain companies have been ordered to build certain models only. Thus, the Military Services will be required to place orders with those companies for only one model, permitting the manufacturers to increase output through this simplification step.

Order L-245 covers aircooled types, and includes requirements for certain specifications calculated to save materials. For example, instruction books furnished with the basic model engines hereafter must be published with pages 6 x 9 in., and the manufacturer may elect whether he illustrates his manual with line drawings or photographs.

The industrial engine branch of the Automotive Division will keep the Military Services advised with respect to engine types and facilities available in order more equitably to distribute the production load throughout the industry.

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Antimony Is Freer

Antimony may be used more liberally in storage batteries, according to an amendment (March 8) to General Preference Order M-112. A wide series of conservation and substitution projects have effectively conserved the metal, WPB reported.

Conservation

WPB Reports Savings Of Materials in 1942

COMPILATION of materials data by WPB discloses that 100 limitation orders have saved to the war effort during 1942:

600,000 tons of steel;
17,000 tons of copper;
Enough manhours to build 23 Liberty ships.

The first limitation order was issued in February, 1942. These orders cover products from hairpins to industrial power trucks.

WPB also estimated that its 82 simplification orders had saved during 1942:

180,000,000 yards of cloth;
30,000 tons of leather;
450,000,000 ft of lumber;
227,000 tons of pulp;
35,000 tons of solder;
8,000 lb of tungsten.

Standardization, "with cooperation with the professional engineering societies and the Services," WPB said, made a good showing in 1942, with the work now proceeding at an accelerated rate.

Simplification has made historic advances in the interest of increasing war production.

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WMC Urges No Shift Of Drivers, Mechanics

War Manpower Commission has ordered the U. S. Employment Services not to attempt to transfer truck drivers and automotive maintenance mechanics employed by distributors of fuels to war manufacturing plants or other essential jobs.

Commissioner Paul V. McNutt also warned against transferring drivers and mechanics employed by trucking companies and garages.

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Vanadium Deposits Found

Vanadium beds, estimated to be rich enough to make the United States self-sufficient when developed, have been reported in Idaho and Wyoming by the U. S. Geological Survey. Most of the imports of the metal have been coming from the Peruvian Andes.

The find was made while geologists were searching for phosphates to augment supplies for fertilizers. The project began in 1911, but it was not until 1937 that the trail was hit by chemical analysis of rocks.

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Copper Limitation Extended

Limited use of copper in cars and trucks was extended on March 4 by Limitation Order L-106, amended, in view of the continued scarcity of this metal.

Increased war demands for copper have kept this, one of the earliest critical materials, on a tight spot despite widespread conservation and substitution of other materials.

About SAE

Milton Ahlers, manager of Machine Tool Division, Sheffield Corp., reads telegram telling of award made by the National Machine Tool Builders Association to the Sheffield Corp. for the greatest machine tool increase in fourth quarter shipments over the third quarter

LT.-COL. BYRON C. FOY has been assigned to Air Service Command, Maintenance Division, Patterson Field, Fairfield, Ohio, under Gen. Clements McMullen, having reported recently from Officers Training School, Miami Beach, Fla.

HERBERT R. PASS is now senior aero dynamicist, Hughes Aircraft Co., Culver City, Calif., having left his position as assistant aeronautical engineer, National Advisory Committee for Aeronautics, Langley Field, Hampton, Va.

Formerly motor transportation instructor, Pomona Ordnance Motor Base, Pomona, Calif., **HARRY EDWARD SMITH** is now senior test engineer for Kinner Motors, Inc., Glendale, Calif.

JAMES M. CHISHOLM, who had been product liaison engineer, Bendix Aviation Corp., South Bend, Ind., is at the USNR Midshipmen's School, Notre Dame, Ind.

WALTER I. BUCHANAN has been made assistant sales manager of Monmouth Products Co., with headquarters in Cleveland. Mr. Buchanan was formerly sales engineer of the same company.

For the past year **CHARLES P. NELSON** has been head automotive instructor, Ordnance Automotive School, Stockton, Calif. Recently he was promoted to chief automotive adviser and transferred to the Ordnance Service Command Shops, Vancouver Barracks, Wash.

NORMAN W. VAN HUSEN, SR., formerly president of Machinery Design, Inc., Detroit, is now president of N. W. Van Husen Engineering, Inc., of the same city.

Recently **DONALD E. LOWMAN** left the employ of the Wright Aeronautical Corp., Cincinnati Division, to become an ensign, U. S. Naval Reserve. Ensign Lowman was a sub-foreman in the Production Test Department of Wright.

ALEXANDER KARTVELI, vice-president and chief engineer of the Republic Aviation Corp., has been honored by Temple University with a degree of Doctor of Science. The degree is being conferred for designing the Republic P-47 Thunderbolt, the Army Air Forces' high-altitude fighter airplane.

C. G. KRIEGER, head of Ethyl's Agricultural Division, has been named acting director of the Farm Machinery and Equipment Division of WPB. Mr. Krieger, on leave from the Ethyl Corp., first went to Washington as deputy director of the FME Division.

WILLIAM E. HORENBURGER left the Precision Mfg. Corp., Fall River, Mass., where he was procurement engineer, to join Burchell Products, Inc., New York City, in a similar capacity.

WALTER A. SEMION, who had been assistant chief engineer, H. J. Heinz Co., Aircraft Product Division, Pittsburgh, is now project engineer at Higgins Aircraft, Inc., New Orleans, La.

Man for man, the British war worker is out-producing his American colleague, **J. CARLTON WARD, JR.,** president of the Fairchild Engine and Airplane Corp., said recently in an address read at the Union League Club meeting. Mr. Ward was unable to attend the meeting, but his speech was read by **CHARLES MARCUS,** vice-president of Bendix Aviation Corp. Both men were members of the aircraft mission which was sent to Great Britain last fall by the War Production Board to study British war production methods. Every worker in Britain, Mr. Ward stated, is fighting this war as though its outcome depended upon him or her alone. Mr. Ward said that 22,500,000 of the total British population of 40,000,000 were engaged in war work.

HUGH W. JOHNSON has joined the staff of the process department, Delco Products Division, General Motors Corp., Dayton, Ohio.

Formerly general manager and chief engineer, Fairchild Aircraft, Ltd., Longueiul, Que., Canada, **N. F. VANDERLIPP** has become manager of the Aircraft Division of Canadian Vickers, Ltd., Montreal.

ROBERT PATRICK VAIL, formerly assistant professor of mechanical engineering, and coordinator of civilian pilot training, Texas Technological College, Engineering Division, Lubbock, Tex., is now with the Pantex Ordnance Plant, St. Francis, Tex., where he is head of mechanical engineering.

ASHLEY C. HEWITT joined the Radioplane Co., Van Nuys, Calif., several months ago, and was recently appointed chief engineer of the Engine Division. Formerly he was with Kinner Motors, Inc., Glendale, Calif., as experimental test engineer.

HOWARD BARLOW, head of the Aeronautical Engineering Department of Texas A&M College, has been elected chairman of the Society of Aeronautical Weight Engineers.

CAPT. BURTON W. ELGIN, U. S. Army Air Forces, is working as maintenance and engineering officer between Patterson Field Air Service Command and Production Engineering, Wright Field, under Gen. McMullen and Col. J. T. Morris, chief and assistant chief of the Maintenance Division of Air Service Command. Capt. Elgin, who for many years has been a member of the Metropolitan Section of the SAE, is headquartered at Wright Field. He was formerly manufacturers' sales representative, with Firestone Steel Products Co., Akron, Ohio.

Capt. Burton W. Elgin

Members

Sir Roy Fedden, special adviser to the British Ministry of Aircraft Production and head of a special engineering mission which recently returned to England, is pictured on a trip through the plants of the Wright Aeronautical Corp. Left to right, are Grover Loening, technical consultant to the WPB, Myron B. Gordon, general manager of Wright, Sir Roy, I. G. Duncan, member of the British Aircraft Ministry, and Arthur Nutt, vice-president in charge of engineering at Wright

LT. (jg) S. UNTERMYER, USNR, who had been at the Naval Air Station in Corpus Christi, Tex., has been transferred to the Navy Yard, Mare Island, Calif.

Formerly junior test engineer, Allison Division, General Motors Corp., Indianapolis, Ind., **WILLIAM H. MURRAY** is now a cadet with the U. S. Army Air Forces.

ROBERT E. ROWLEY, executive engineer, General Plant Division, City of Los Angeles, Department of Water & Power, has been elected president of the Los Angeles Chapter of the American Society of Military Engineers. During the past year Mr. Rowley has been working part time with the U. S. Army as expert consultant on automotive equipment operation and maintenance, particularly in the desert training area.

Robert E. Rowley

Formerly a first lieutenant in the U. S. Army Air Forces, 113th Observation Squadron, Key Field, Meridian, Miss., **TITUS E. FRANKENFIELD** has been promoted to captain and is now stationed at Headquarters Air Service Command, Patterson Field, Fairfield, Ohio.

C. L. CUMMINS, founder and president of the Cummins Engine Co. of Columbus, Ind., and a past vice-president of the SAE, has been appointed executive consultant on diesel engine production to the War Production Board. Commenting on his appointment Mr. Cummins said, "All of us in the diesel industry recognize that a definite program of increased diesel production is essential to victory, and we propose to do this through cooperation between industry and Government."

C. L. Cummins

Formerly material conservation supervisor, Boeing Airplane Co., Wichita, Kan., **C. H. SPECK** is now assistant manager of the Materials and Process Engineering Department of Goodyear Aircraft Corp., Akron, Ohio.

SAMUEL R. WATSON has joined the Packard Motor Car Co., Detroit, as process tool engineer. He was formerly process engineer with Tool Design & Engineering Service of the same city.

PAUL W. EELLS has been promoted from executive engineer to vice-president in charge of engineering, LeRoi Co., West Allis, Wis.

Among the judges in the Continental Aircraft Design Competition for 1942-43 were **PETER ALTMAN,** director, Manufacturing Research Division, Vultee Aircraft Corp., Highland Park, Mich.; **WILLIAM B. STOUT,** president, Stout Skycraft Corp., Dearborn, Mich.; **JAMES J. SHIELDS,** Continental Aviation and Engineering Corp., Detroit. This competition is sponsored by the Continental Aviation and Engineering Corp. for the members of the junior aeronautical engineers in airplane design at the University of Detroit.

BRUNO KOTOWSKI, who had been product supervisor, Murray Corp. of America, Detroit, has joined Timm Aircraft Corp., Van Nuys, Calif., as liaison engineer.

JOHN O. KOBZINA, JR. has joined the General Machinery Corp., Hamilton, Ohio, as project engineer. Mr. Kobzina was formerly diesel development engineer, International Harvester Co., Chicago.

CHARLES W. BOHMER, JR. has been appointed assistant supervisor of the fuels and lubricants section of the Engineering Division of Esso Marketers. Mr. Bohmer worked as a chemical engineer at the Standard Oil Development Co., and was transferred to the Field Service Division in 1933. When this division was transferred to the

Standard Oil Co. of New Jersey, he became lubrication engineer.

SAMUEL F. PRATT has been elected general secretary of the Pennsylvania Grade Crude Oil Association, oil trades group for Pennsylvania refiners and producers, with headquarters in Oil City. He was formerly European manager of the Association, and was abroad from 1936 to 1939 in charge of

Samuel F. Pratt

that phase of operations. He began his service with the Association about 10 years ago as field service division representative in St. Louis. Later he was assigned to Philadelphia and then went to the home office as manager of the field staff for a year before his European appointment.

HERMAN L. HALL, formerly a student at the Aero Industries Technical Institute, has joined Northrop Aircraft, Inc., Northrop Field, Hawthorne, Calif., as detail draftsman and liaison engineer.

Formerly with the F. A. Smith Mfg. Co., Rochester, N. Y., **E. W. GRIFFITH** has joined the Morris A. Elliott Co., Baltimore, as department manager.

University of Michigan graduate **EDWARD J. NESBITT** has joined the structures section of the Helicopter Engineering Department of Sikorsky Aircraft, Stratford, Conn.

TOM ASHLEY and **HOWARD W. BARLOW** are joint chairmen of the Annual Texas Aviation Conference to be held on the campus of the Texas A & M College at College Station, May 6 to 8. One of the major sessions scheduled is to be sponsored by the SAE Texas Section. Other SAE members on the General Committee for the meeting are **ALLEN GUIBERSON** (chairman of SAE Texas Section), Guiberson Diesel Engine Co., **GEORGE HADDAWAY,** *Southern Flight.* **EDWIN JACKSON,** Globe Aircraft, **FRED LOCKWOOD,** Guiberson Diesel Engine Co., **HAROLD SCHWEDES,** North American Aviation.

EDMUND F. GRIFFIN, formerly with the Laidlaw Co., Inc., New York City, is now with the Bridgeport Fabric Co., Inc., Bridgeport, Conn.

WILLIAM C. LAWRENCE, who had been equipment engineering specialist, War Production Board, Washington, has joined American Airlines, Inc., La Guardia Field, New York, as director of development.

Formerly treasurer of the Trailer Co. of America, Cincinnati, **CHARLES J. DALTON** is director of the Post-War Policy Division of American Type Founders, Inc., Elizabeth, N. J.

WILLIAM B. HOEY, Plastic Processes, Inc., addressed a recent meeting of the Chicago Chapter, Society of Plastic Engineers, on "The Jet Molding Process." Mr. Hoey, former Bakelite executive, became president of Plastic Process, Inc., about the middle of last December.

WILSON C. BRAY has been made sales manager of the Eastern Division of the B. F. Goodrich Co., Akron, Ohio. Before joining Goodrich Mr. Bray was general sales manager of Harry Ferguson, Inc., Dearborn, Mich.

Manager of the newly-created Miscellaneous Manufacturing Department of the Curtiss-Wright Corp., Propeller Division, Caldwell, N. J., is **RAYMOND R. SNYDER,** who for two years was quality manager at the Indiana Plant. Mr. Snyder's experience with airplanes and equipment goes back to World War I days when he earned the distinction of being one of America's first flying aces while serving with the 85th Aero Squadron.

LT.-COL. AL BODIE, who had been chief of the Manufacturing Methods Branch, Western Procurement District, Materiel Command, Army Air Forces, Los Angeles, was recently promoted from the rank of major, and has been transferred to the plant of the General Aircraft Corp., Astoria, L. I., N. Y. He is resident representative, Army-Navy contracting officer for the Army Air Forces.

FREDERICK JOHN GUNTHER is an ensign in the U. S. Naval Reserves. In civilian life he was sales engineer at the Waukesha Motor Co., Waukesha, Wis.

EDWARD A. SUTHERLAND is now in the U. S. Army Air Forces, and is stationed at the San Antonio (Tex.) Aviation Cadet Center. He had been experimental test engineer, Pratt & Whitney Aircraft, East Hartford, Conn.

Formerly a student at the College of the City of New York, **RICHARD N. SHIELDS** is now a student engineer at the Chrysler Corp., Highland Park, Mich.

WILLIAM G. ANDERSON is with the National Advisory Committee for Aeronautics, Cleveland Airport, Cleveland, Ohio, as assistant mechanical engineer. Previously Mr. Anderson was an instructor in mechanical engineering at the Newark (N. J.) College of Engineering.

F. W. LAMPE has joined the research laboratory of the Curtiss-Wright Corp., Buffalo. He had been an engineer with General Motors' Chevrolet Division in Detroit.

C. J. McCARTHY has been transferred from the Vought-Sikorsky Aircraft Division, United Aircraft Corp., Stratford, Conn., to vice-president of United Aircraft Corp., East Hartford.

WILLIAM T. DRURY, JR. is chief automotive adviser to the assistant chief of staff, Headquarters Armored Force, War Department, Fort Knox, Ky. In civilian life he was maintenance manager, Southeastern Greyhound Lines, Lexington, Ky.

Formerly chief engineer, Linn Mfg. Corp., Morris, N. Y., **WILLIAM J. ANDRES** is now quality engineer, The Autoyre Co., Oakville, Conn.

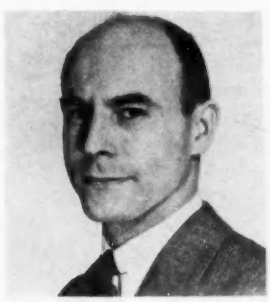
Formerly a captain, **HORACE R. HIGGINS,** U. S. Army Ordnance Department, Field Service Division, Washington, has been promoted to major.

MAJOR OTTO LESSING, USMC, has been transferred from the Engineer School, Hadnot Point, Marine Barracks, New River, N. C., to Engineer Battalion, FMF Training Center, Camp Elliott, San Diego, Calif.

Formerly instructor in applied mechanics, Purdue University, West Lafayette, Ind., **THOMAS J. HERRICK** is now with the McDonnell Aircraft Corp. of St. Louis, Mo., as an engineer.

More Thompson Advancements

Changes in personnel at Thompson Products, Inc., in addition to those listed on p. 35 of the March *SAE Journal* include **JOHN VAN EPPS,** who has been named factory engineer for the Aircraft Accessories Division of Thompson. He is responsible for the methods, routing and tooling of products manufactured by the division; **T. R. THOREN,** who has been working in the production of pumps, has been designated as chief development engineer. **H. E. JACOBUS** has been promoted from assistant aircraft accessories engineer to air craft accessories engineer, and **DONALD R. SPOTZ** takes over the position of assistant aircraft accessories engineer.



John Van Epps

T. R. Thoren

H. E. Jacobus

Donald R. Spotz

RICHARD H. BANCROFT, formerly assistant plant manager of the New Castle Plant, Perfect Circle Co., has been named manager.

EDMOND E. BISSON, associate mechanical engineer, Aircraft Engine Research Laboratory, National Advisory Committee for Aeronautics, has been transferred from Langley Field, Hampton, Va., to Cleveland.

Formerly shop superintendent, National Transportation Co., New York City, **ROBERT R. PERRINO** is principal instructor at the Motor Training School, U. S. Government Quartermaster Replacement Training Center, Camp Lee, Petersburg, Va.

Formation of a manpower utilization committee of the Automotive Council for War Production was announced recently by **ALVAN MACAULEY,** president of the Council. Its function will be to obtain the fullest efficient utilization of manpower in the car industry's war production plants. The committee is headed by **C. E. WILSON,** president of General Motors, and brings together top-ranking officials of the industry including the following SAE members: **C. C. CARLTON,** vice-president, Motor Wheel Corp., **ROBERT H. DAISLEY,** vice-president, Eaton Mfg. Co., **BEN F. HOPKINS,** president, Cleveland Graphite Bronze Co., **E. A. CLARK,** vice-president, Budd Wheel Co., **C. J. REESE,** president, Continental Motors Corp., **H. L. WECKLER,** vice-president and general manager, Chrysler Corp., **HAROLD VANCE,** chairman, Studebaker Corp.

C. E. FRUDDEN is back at the Allis-Chalmers Mfg. Co., Milwaukee, Wis., having been with the War Production Board for nearly a year. He is in the company's Tractor Division as consulting engineer.

Formerly forging engineer, Weatherhead Co., Cleveland, Ohio, **JOHN R. PARKS** has become superintendent of the Spengrey Cap Co., Louisville, Ky.

SHERROD E. SKINNER, vice-president of General Motors, and on leave as general manager of Oldsmobile, has been appointed director of the new office of production scheduling in the Army's Services of Supply. He had been head of the SOS production division.

JOHN W. VOTYPKA, formerly director of engineering for Fruehauf Trailer Co., has been appointed head industrial specialist of the Production Service and Smaller War Plants divisions of the Detroit regional office of WPB. He has been associated with the automotive industry since 1913, when he started to work for Fisher Body Co.

FRANK M. SMITH is deputy director of the Smaller War Plants Division, War Production Board, Washington. Mr. Smith had been vice-president and general manager of the Stout Engineering Lab., Inc., and Century Motors Corp., Dearborn, Mich.

G. M. BELLANCA, chairman of the Board of Bellanca Aircraft Corp., New Castle, Del., has joined Higgins Industries, Inc., New Orleans, La., as consulting aeronautical engineer and designer.

CHARLES S. STONE, research engineer for the National Advisory Committee for Aeronautics, Aircraft Engine Research Laboratory, has been transferred from Hampton, Va., to Cleveland, Ohio.

Formerly an executive at the Willard Storage Battery Co., Cleveland, **CARL F. NORBERG** now holds a similar position with the Electric Storage Battery Co., Philadelphia.

Bellanca Aircraft Corp., announces the election of **L. C. MILBURN** to president and member of the executive committee. Mr. Milburn has been with Bellanca for two years, and has been in aircraft production and design for 25 years, mostly in executive and management capacities with Glenn Martin Co. and Curtiss-Wright.

WESLEY L. LOSSON has been made assistant manager of the License Division, Wright Aeronautical Corp., Paterson, N. J. He was formerly license division engineer.

ARTHUR A. WOODWARD is with the War Production Board as senior industrial specialist for the duration. He had been experimental process engineer, Micromatic Hone Corp., Detroit.

ERNEST L. FOSS, who had been training coordinator, Owens-Corning Fiberglas Corp., Newark, Ohio, has become account executive for the Grant Advertising Co. S. A., Mexico City.

Promotion of **L. W. CHRISTENSON** from assistant sales manager to sales manager, Cleveland Graphite Bronze Co., was recently announced. Mr. Christenson joined

L. W. Christenson

the company in 1923 in the bushing department, and a year later became supervisor of bushing installations in the western territory. In 1928 he entered the sales department, and was appointed assistant sales manager in 1941.

DAN LeR. DRESSER has accepted a position as chief automotive technician at the Reno Army Air Base, Reno, Nev.

THOMAS O. ARNTSEN, first lieutenant in the U. S. Army Air Forces, is project officer at the Midwestern Procurement District, Wichita, Kan. Previously Lt. Arntsen was a special training instructor for the U. S. Army Corps of Engineers, Fort Leonard Wood, Mo.

WILLIAM E. BURNETT is serving a new branch of the American Expeditionary Forces in the African battle zone. After months of war maneuvers in North Carolina, observing and assisting with the maintenance of Cadillac M5 tanks, he was sent into the combat zone to report on the actual operation and performance of these iron horses. Mr. Burnett came into the technical observation service in the capacity of civilian expert representing Cadillac Motor Car Division, bringing 13 years of experience in the engineering department.

Arthur W. F. Green

Appointment of **ARTHUR W. F. GREEN** to materials engineer administrator over the Heat Treating and Plating Divisions of N. A. Woodworth Co., Ferndale, Mich., was recently announced. Mr. Green formerly was materials engineer for Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn. He has been associated with the steel and metals industries since 1916.

JOHN SHEARMAN DONALDSON, research engineer for the Donaldson Piston Corp., New York City, is a major in the U. S. Army Air Forces.

GEORGE P. TEXADA has been promoted from captain to major, and has been transferred from 2nd Air Service Area Command, Fort Worth, Tex., to Headquarters Air Service Command, U. S. Army Air Forces, Patterson Field, Fairfield, Ohio. Major Texada is liaison officer to the Flying Training Command on fuels and lubricants.

1ST LT. WALTER H. ZIEGLER, 91st Ordnance Company, formerly of Camp Howze, Tex., can be reached through A. P. O. 403 Annex, Shreveport, La.

Formerly assistant project engineer, Sinclair Refining Co., East Chicago, Ind., **ENSIGN H. S. GERSTUNG,** USNR, is now stationed at Fort Schuyler, Bronx, N. Y.

ENSIGN CHARLES R. SECORD, USNR, who had been experimental design engineer, Curtiss-Wright Corp., Airplane Division, Buffalo, is in the U. S. Navy, stationed at the Purdue Union Club, West Lafayette, Ind.

RICHARD L. ZENKER is an engineering cadet in the U. S. Army Air Forces, and is now at the training station at Yale University, New Haven, Conn. Before entering military service he was a test engineer for the Packard Motor Car Co., Detroit.

CAPT. CHARLES M. HANNUM is in the U. S. Army Ordnance Department, Carbine Industry Integration Committee, New York City. As a civilian he was assistant chief engineer, National Tool Co., Cleveland, Ohio.

1ST LT. NATHAN ROBERT ROSENGARTEN is in the Flight Test Branch, Flight Section, U. S. Army Air Forces, Wright Field, Dayton, Ohio. He was formerly in the Materiel Division at Wright Field.

ENSIGN C. A. WITHINGTON, JR., USNR, formerly an instructor of engineering defense training courses, University of

California, Berkeley, Calif., is now at the Naval Training School, Massachusetts Institute of Technology, Cambridge, Mass.

LEON MIRONOV, a graduate of the College of the City of New York, is working at Curtiss-Wright Corp., Airplane Division, Buffalo.

Project Engineer

Jay A. Bolt

JAY A. BOLT is engineer in charge of special projects for the Stromberg Aircraft Carburetor Section of the Bendix Aviation Corp. Before joining Bendix he was assistant professor of aeronautical engineering at the University of Notre Dame.

ROY C. WALLACE, JR. has joined the Aviation Division of the Ward Furniture Co., Fort Smith, Ark. Formerly Mr. Wallace was a welding instructor, Vocational Education for National Defense, Tulsa, Okla.

GEORGE W. HAZEN has been promoted from lieutenant to captain. He is now stationed at the Ordnance School, Aberdeen Proving Ground, Aberdeen, Md.

WILLIAM J. TELL, who had been chief engineer, Eastern Aircraft Division, General Motors Corp., Linden, N. J., has joined the Cadillac Motor Car Division, General Motors Sales Corp., Detroit, in the capacity of executive engineer.

C. C. LEWIS has left the Bendix Westinghouse Auto-Air Brake Co., Elyria, Ohio, to become plant manager of Schick, Inc., Stamford, Conn.

Formerly general manager of the Nebraska Defense Corp., Fremont, Neb., **RUSSELL A. FIRESTONE** is now at the Firestone Tire & Rubber Co., Akron, Ohio.

FRANK J. HAHN has been made chief test engineer of Pratt & Whitney Aircraft Corp. of Missouri, Kansas City. Mr. Hahn was transferred from Pratt & Whitney Aircraft in East Hartford, Conn., where he was experimental test engineer.

M. C. VAN SANDWYK, who has been service promotion head, General Motors, South Africa, Ltd., Port Elizabeth, South Africa, is temporarily transferred to General Motors Near East, S. A., Alexandria, Egypt, as reconditioning manager. Mr. Van Sandwyk is attached to the United Nations Forces, Middle East.

WILLIAM P. HEADDON has been named supervisor of the fuels and lubricants section of the Engineering Division of Esso Marketers. Mr. Headdon has been active in the Engineering Division of the company for 14 years. He was employed at the Bayway (N.J.) refinery as a student engineer in 1929. Later he was assigned to research, and in 1934 was transferred to New York City with the Engineering Division. In 1937 he was promoted to assistant supervisor of the fuels and lubricants section.

ENSIGN B. FURMAN WILKES, USNR, has been transferred from the U. S. Naval Training Station at Cornell University, Ithaca, N. Y., and is assigned to duty in the Pacific as an aircraft power turret maintenance engineer.

Formerly chief engineer, Allis-Chalmers Mfg. Co., Springfield, Ill., **EMIL F. NORELING** is now a lieutenant colonel in the Ordnance Department of the U. S. Army, Tank-Automotive Center, Detroit.

1ST LT. ROBERT J. WHITLEY, U. S. Army, has been transferred from Holabird Ordnance Depot, Baltimore, Md., to the Field Service Division, Preventive Maintenance Section, Arlington, Va.

CAPT. BYRON ROTHPLETZ is at present stationed at Camp Van Dorn, Miss., in the Quartermaster Corps of the U. S. Army. In civilian life he was supervisor of automotive maintenance at the Atlantic Refining Co., Philadelphia.

CHARLES F. DUFFY, auto examiner, Vehicle Homicide Squad, New York Police Department, was tendered a farewell party

Charles F. Duffy

by his associates when he retired after nearly 35 years. He has been a member of the Society for 23 years, and has been active in Metropolitan Section.

Formerly acting head automotive adviser, **JOE M. MILLER** is now head automotive technician, Headquarters, 35th Infantry Division, A.P.O. 35, San Luis Obispo, Calif.

LEE KETCHUM has transferred from sales engineer, Six Robblees, Inc., Seattle, Wash., to the Kenworth Motor Truck Corp., of the same city.

FRED C. SMITH has joined Tube Turns, Inc., Louisville, Ky. Mr. Smith was formerly with the Carnegie-Illinois Steel Corp., Chicago.

W. B. GIBSON has entered military service as a captain in the Corps of Engineers, Columbus General Depot, Columbus, Ohio. Capt. Gibson was formerly engineer and sales manager of the Motor Coach Division, Reliance Trailer & Truck Co., Inc., San Francisco.

A graduate of Oregon State College, **2ND LT. DONALD D. McMILLAN** is in the Corps of Engineers, 814 Engineer Battalion (Aviation), A.P.O. 529, New York, N. Y.

Student members of the SAE now working in war materials manufacturing plants include **JAMES C. BOND,** formerly University of Southern California, now plant layout man, Pontiac Motor Division, General Motors Corp., Pontiac, Mich.; **RICHARD LEE HOOVER,** formerly Ohio State University, now a designer at Consolidated Aircraft Corp., San Diego, Calif.; **RUPERT D. JONES,** formerly Curtiss-Wright Institute, now modification design engineer, North American Aviation Modification Center, Kansas City, Kan.; **JAMES EDWARD DIMMETT,** formerly Purdue University, now test engineer at Pratt & Whitney Aircraft, East Hartford, Conn.; **HENRY A. ABRAMOWICZ,** formerly Aero Industries Technical Institute, now liaison engineer, Northrop Aircraft Co., Inc., Hawthorne, Calif.; **JOHN T. LIPFORD,** formerly Massachusetts Institute of Technology, now junior methods engineer, Eastern Aircraft Division, General Motors Corp., Linden, N. J.; **RICHARD W. ROBERTS,** formerly Illinois Institute of Technology, now a graduate engineer at Holley Carburetor Co., Detroit; **MARSHALL G. REID,** formerly University of Wisconsin, now an engineer in mechanical goods development, Goodyear Tire & Rubber Co., Akron, Ohio; **EUGENE S. MACHLIN,** formerly College of the City of New York, now junior mechanical engineer, National Advisory Committee for Aeronautics, Cleveland Municipal Airport.

Two SAE members have been named by SAE Vice-President **GEORGE KRIEGER,** acting director, WPB's Farm Machinery & Equipment Division, to serve in the new set-up of the division. They are **A. W. LAVERS,** chief engineer, Minneapolis-Moline Power Implement Co., who is chairman of the SAE Tractor War Emergency Committee and a member of the SAE Tractor & Farm Machinery Activity Committee; and **ELMER McCORMICK,** chief engineer, John Deere Tractor Co., a member of the SAE Tractor War Emergency Committee and also of the SAE Tractor & Farm Equipment Activity Committee.

OBITUARY

Elmer H. Schwarz

Elmer H. Schwarz, consulting engineer and patent expert, died suddenly at his home in New Jersey on Feb. 21. Mr. Schwarz, a member of the SAE since 1917, was a partner in the engineering firm of Schwarz, Hughes and McCarthy of New York City. His services as a patent expert have been in demand both here and abroad in the litigation of cases involving patents of a technical nature. He held a number of patents for inventions of his own.

Hotel New Yorker, New York City ★ ★ ★ April 8-9

THURSDAY, APRIL 8

Morning — Aircraft

Problems in Wood Aircraft
– I. C. Peterson, Civil Aeronautics Administration

Effect of Openings in Molded Plywood Structures
– L. J. Marhoefer, Vidal Research Corp.

Morning — Aircraft Engine

Chevrolet's Aviation Engine Test Plant. Its Organization – Development and Operation
– P. A. Collins, Chevrolet Motor Division

Training Operators for Aviation Engine Testing
– L. R. Grandy, Buick Motor Div.

Afternoon — Aircraft

New Windshield Developments
– A. L. Morse, Civil Aeronautics Administration

An Aircraft Double Windshield – Its Development and Use
– R. L. McBrien, United Air Lines Transport Corp.

Afternoon — Aircraft Engine

Improving Fatigue Strength of Engine Parts
– J. O. Almen, Research Laboratories Div., General Motors Corp.

Evening — Aircraft Engine and Aircraft

Topic: Aircraft-Engine Installation Problems
– Papers will be read by F. V. H. Judd, United Aircraft Corp., Research Div.; H. D. Scrymgeour, Consolidated Aircraft Corp.; H. Karcher, Allison Div., General Motors Corp.; H. E. Moerman, Wright Aeronautical Corp.; Leslie T. Miller, Glenn L. Martin Co.; and T. Hammen, Ranger Aircraft Engines

FRIDAY, APRIL 9

Morning — Aircraft

Field Maintenance and Repair of Fighting Airplanes
– N. L. Kearney, Curtiss-Wright Corp.

A Method of Applying Production Design to Aircraft
– H. M. Harrison, Lockheed Aircraft Corp.

Morning — Aircraft Engine

Operating Temperatures and Stresses of Aluminum Aircraft-Engine Pistons
– E. J. Willis and R. G. Anderson, Aluminum Co. of America

The Possibilities of Shaved Gears for Aircraft Engines
– A. W. Harris, Chevrolet Motor Div.

Afternoon — Aircraft

An Electronic Method for Endurance Testing of Propeller Components
– R. M. Guerke and G. P. Knapp, Curtiss Propeller Div.

Pre-rotation of Aircraft Tires Before Landing
– W. H. Elliott, The B. F. Goodrich Co.

Afternoon — Aircraft Engine

Intake Systems for Aircraft Engines
– C. T. Doman, Aircooled Motors Corp.

Cooling Characteristics of Steel and Aluminum Finned Cylinders for In-Line Aircraft Engines
– Marcel Piry, Ranger Aircraft Engines

Evening — Aircraft Engine and Aircraft

Welcome from Herbert Happersberg, chairman Metropolitan Section, SAE

Mac Short, president SAE

Direct-Lift Aircraft
– Igor Sikorsky, Sikorsky Aircraft Div., United Aircraft Corp.

Engine Conditioning Urgent In Maximum Efficiency Aim

continued from page 24

lower speed range, he listed the following: Camshafts ground to alter valve action; manifolds changed to obtain more velocity; better distribution, and better vaporization; restriction between carburetor and intake manifold with a ⅝ in. opening; removal of carbon from combustion chamber and seating the valves; timing of ignition to its peak; using light engine oil; shielding the radiator, resetting the thermostat in cooling system to open at 180 F, and so on. The most difficult task, he said, is the education of the driving public in the proper use of the throttle and brakes.

Mr. Abell mentioned the possibilities of the future through improved oils, cars, and highways. As an example he cited the Wright Whirlwind engine in 1926 which produced 400 hp using 55 octane fuel as compared with a similar engine today using 128 octane fuel and producing 2100 hp.

In a survey made over a period of months by the Richfield Oil Co., Gerthal French, one of the discussers, reported that his company averaged 18.6 mpg using regular gasoline. By changing spark plugs, they obtained 19.2 mpg, then by removing carbon and timing engine to its peak they got 20.3 mpg. They found that today on regular gasoline with engine in good condition and properly timed the results are much better than those obtained a year ago with engine not properly conditioned and timed.

Sees Aviation Industry Heading For Terrific Post-War Letdown

▪ *Southern California*

"The airplane will take a lead position in winning the war for our nation, but as an industry, is about to commit hari-kari in the post-war period, unless we immediately direct our traffic and engineering talent toward research in the field of commercial utilization." Such was the prediction of Thomas Wolfe, Western Air Lines, Inc., to the members and guests of the Feb. 5 meeting of the Southern California Section. Harry Woodhead, president of Consolidated Aircraft Corp., also presented a paper at this meeting, excerpts from which appear beginning on p. 17 of this issue.

"Keep in mind," continued Mr. Wolfe, "that after the war the existence of the airplane industry is totally dependent upon one of two things: (1) the extent to which the

The Speakers' Table at the March 5 Southern California Section Meeting. Left to right: R. W. Miller, Republic Aviation Corp., Ed Zivi, Glenn L. Martin Co., Gordon Throne, North American Aviation, Inc., Harold Adams, Douglas Aircraft, Inc., J. B. Wassall, Vega Aircraft Corp., C. T. Torresen, North American Aviation, Inc., John A. C. Warner, secretary and general manager of the SAE, SAE President Mac Short, Vega Aircraft Corp., Foster M. Gruber, Douglas Aircraft Inc., Speaker B. C. Boulton, Lockheed Aircraft Corp., (Mr. Boulton's paper, "Economic Aspects of Standardization," which describes in detail the effective work on airframe standards being accomplished by the National Aircraft Standards Committee, will be printed in full in the May issue of the SAE Journal), Speaker J. D. Redding, SAE staff, (Mr. Redding's paper, "Aircraft Standards for Victory," appears in full beginning p. 20 of this issue of the Journal), Gordon Waite, Consolidated Aircraft Corp., L. D. Bonham, Lockheed Aircraft Corp., Warren Boughton, Douglas Aircraft, Inc., H. E. MacDonald, Curtiss-Wright Corp.

airplane can earn its own bread; or (2) the extent to which the taxpayer will subsidize aviation."

Mr. Wolfe believes that we are faced with a terrific lag between our production capacity and our traffic capacity. "We should start putting traffic experts to work on an extensive scale to prepare a program of air commerce after the war. This will take time and should be undertaken immediately," he advised.

"If an estimate of 10% of our 185,000 war plane production diverted to cargo-type planes is correct, we will be left with 18,500 planes, or a ton-mile capacity of 107 billion," he reported. He added that our total class I railroad freight in 1941 was only 373 billion tons additional. Up to the war, he said, we were carrying about 2.48% of what we can expect by 1955. Our overall expansion will be about 40 times our present performance, he predicted, but warned that the shadow hanging over the head of our nation is the terrific production capacity available in light of the domestic requirements. Even if we multiply this domestic requirement by three, to include unborn commerce and international commerce, the airplanes could be produced in one month's time to handle this entire traffic, not considering the war hangover of 18,000 planes.

Helicopter Convertible To Autogyro Principle

▪ Metropolitan

Discussing the question of the passengers' fate if the motor of a helicopter stops, Igor I. Sikorsky, Sikorsky Aircraft Division, United Aircraft Corp., explained to the Jan. 15 meeting at Brooklyn Polytechnic Institute that an automatic device can be provided to convert the helicopter to the autogyro principle by simply changing the blade angle, thereby allowing safe controlled landings even with motor failure.

Mr. Sikorsky described the helicopter as a standard airplane revolved 90 deg, with a large propeller, better referred to as a rotor, to obtain the lifting force. Covering briefly the design features of the helicopter, Mr. Sikorsky noted that the rotor uses a lower rpm than the airplane propeller, that the power loading should not exceed about 10 to 15 lb per hp, and that the disc loading should be about 2 or 3 lb per sq ft. The disc area is defined as the area described by the rotor during its revolution. A craft conforming to these requirements and other applicable specifications will easily have a lifting force of 12 lb per sq ft, according to Mr. Sikorsky.

The airplane has well satisfied the object of flying at high speed, but the large landing fields required have prevented our reaching inaccessible regions. Modern civilization can benefit greatly by the helicopter through being able to make short flights to and from points otherwise inaccessible to the airplane or even to ground transportation.

He concluded his talk with a 20-min film showing his present ship simply executing vertical landings in very difficult and close spots on land and water.

Serving on CRC

SAE representation on the Cooperative Research Council for 1943 has been approved by the Council. Appointments for the coming year are B. B. Bachman, Autocar Co., J. M. Crawford, Chevrolet Division, General Motors Corp., William Littlewood, American Airlines, Inc., J. B. Macauley, Jr., Chrysler Corp., Arthur Nutt, Wright Aeronautical Corp., C. G. A. Rosen, Caterpillar Tractor Co.

Reflections of Army Training To Appear in Post-War Driving

▪ Metropolitan

When the Army numbers 10,000,000 men, we shall have included in this number nearly 3,000,000 trained drivers. This will be the direct result, according to Milton D. Kramer, speaker at the Feb. 18 meeting of the Metropolitan Section, of driver-training programs now under way. The Army plans to train one out of every four men in the Army, he said, to handle motor vehicles properly so that the loss of a driver in the field will not hamper any plan of action.

Mr. Kramer, administrative assistant at New York University, reported that the motor transport problem became apparent at the start of Army expansion, and the necessity for an efficient training program was soon realized. New York University was requested to participate in the development of a training system, and Mr. Kramer then began his work with the Government agencies to complete the technical manuals, pamphlets, and training programs.

Important to remember, he emphasized,

is that the driver is always faced with the problem of making snap decisions. Therefore a training program must develop the ability to make decisions quickly and correctly. Mr. Kramer believes that the commercial operator is going to benefit considerably after the war by the Army's present training program. Commercial drivers need the disciplined driving provided by the Army and, furthermore, the Army teaches drivers maintenance procedures and the principles and methods of conservation.

Two Signal Corps films were shown at the conclusion of the talk.

CCNY Student Branch Is Formally Inducted

The SAE Branch at the College of the City of New York was formally inducted into the Society structure at a meeting on Feb. 18. Norman G. Shidle, *SAE Journal* executive editor, representing SAE headquarters, told the 35 students assembled that: "The SAE has little to *give* . . . but you can *take* from it, if you will, an amazing wealth of knowledge, experience, contacts – and friends." Mr. Shidle pointed out that those who are members in name only cannot possibly hope to obtain any benefit from the organization.

SAE in War

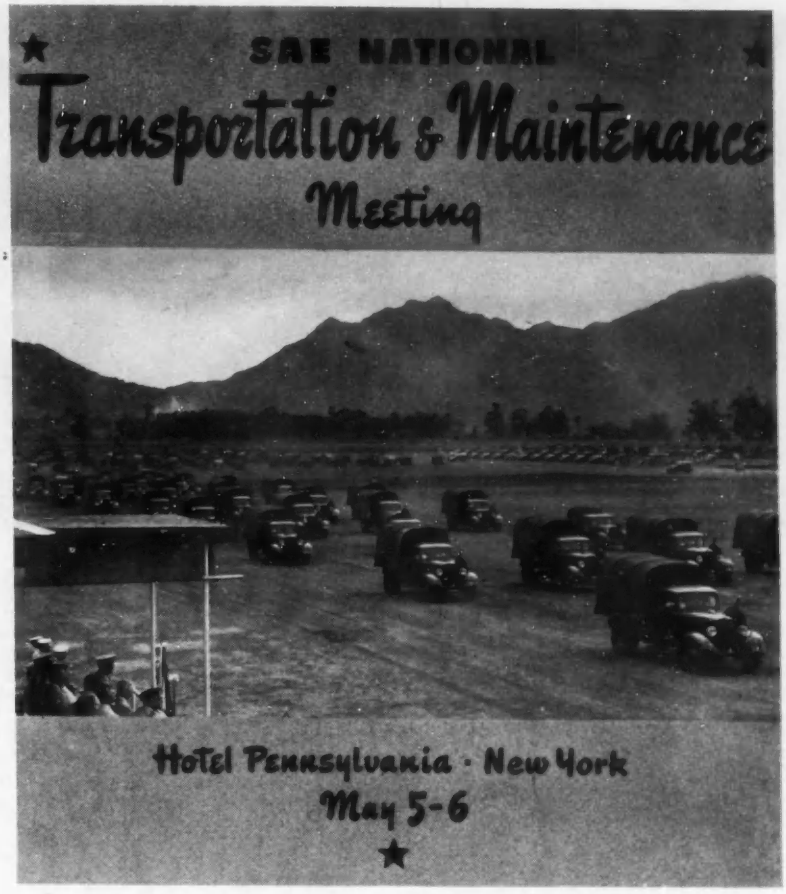
In discussing the work of the SAE as a whole, he emphasized the important part which the SAE is playing in the war effort through the work of the War Activity Council and the committees working under it. These committees, he said, act only at the request of a responsible agency, function in a consulting capacity, and once their report is delivered they make no attempt to foster its adoption. In this way numerous important studies have been carried out for the Government, resulting in the improvement of our weapons.

Chairman of the meeting was CCNY Student Branch Chairman George Moncher.

Kenneth Kasschau, SAE Metropolitan Section Student Chairman, congratulated the student group on the two and a half years of constructive work leading up to its admission to the SAE as a student branch, and announced Metropolitan Section plans to hold more meetings designed especially for students.

Formal presentation of a charter to the new Branch was made by Hollister Moore, manager of the Section and Membership Departments of the SAE.

Completing the inauguration program, Prof. G. C. Autenrieth and Assistant Prof. W. L. Stork, faculty advisers to the Branch, spoke briefly. Prof. Autenrieth stressed the fact that the college, like the SAE, has little to give, but much from which to take, while Prof. Stork praised the pioneer work of the students who stimulated the CCNY-SAE group originally and those who carried its early activities, as well as that of the students currently participating.



Officers and faculty advisers of the SAE Student Branch of the College of the City of New York pictured in the Diesel Section of the Mechanical Engineering Laboratory of the college. Left to right: R. Horan, vice-chairman, Prof. W. Stork, faculty adviser, M. Lite, treasurer, G. J. Moncher, chairman, Prof. G. C. Autenrieth, faculty adviser, H. Gallin, secretary

Too Much Asbestos in Friction Materials Harmful to Metals

▪ *Milwaukee*

In his paper, "Trend in Friction Materials," presented at the Feb. 5 meeting of the Milwaukee Section, C. A. Schell, vice-president in charge of engineering, Thermoid Co., highlighted methods used in the production of brake linings and their applications, and discussed the theories involved.

Mr. Schell listed sheeter, extruded, wireback and dry-mix types as the most popular of the molded friction materials. The first three of these are made by mixing a medium fiber asbestos with a cement containing the necessary binders and fillers to the consistency of a dough. The sheeter type is rolled on to a large steam-heated drum to the proper thickness, the heat of this drum drying off the solvent; the extruded type is pushed through a nozzle under hydraulic pressure; the wireback type is rolled between two cold rolls on to the reinforcing wire. The dry-mix type is mixed with a dry molding resin and fillers, is leveled off, cured,

Present at the Aircraft Accessories & Equipment Subdivision meeting, held in New York City on Feb. 22, were (reading clockwise): Major J. Melvin Miller, Working Committee of the Aeronautical Board; R. L. McBrien, United Airlines Transport Corp.; T. R. Thoren, Thompson Products, Inc.; H. M. Hucke, RCA Mfg. Co., Inc.; C. V. Johnson, Bendix Products Division, Bendix Aviation Corp.; C. E. Stryker, Aircraft Production Board; R. C. Bergh, Republic Aviation Corp.; C. Hollerith, Hayes Industries, Inc.; William Littlewood, chairman, American Airlines, Inc.; J. D. Redding, SAE staff representative; P. F. Weber, Kollsman Instrument Division, Square D Co.; Jack Vitol, Aircraft Engineering Division, Civil Aeronautics Administration; C. W. Pepperman, Lewis Engineering Co.; W. F. Skillin, Chandler-Evans Corp.; W. C. Lawrence, American Airlines, Inc.; C. C. Shangraw, Eclipse Aviation Division, Bendix Aviation Corp.; E. W. Rentz, Jr., SAE staff representative.

and compressed into a sheet of the required thickness.

"Copper alloys, wires or chips are used in a great many friction materials," the speaker said. "They increase life to some extent and have a stabilizing effect on friction under various conditions. Copper alloys in friction materials generally decrease the maximum friction and increase the minimum. In other words, they create a narrower friction band."

Asbestos, he continued, if used too generously in friction materials without oils or fillers such as mild lubricants or alleviators, has a tendency to score or cut adjoining metals. "The most flexible and cleanest of this asbestos fiber," Mr. Schell went on, "is found in Quebec Province, Canada, where it is mined directly under the surface. It is cleaned and graded according to size, the larger fiber used for spinning and the lesser grades going into molded products and insulations of all kinds."

Curtailments and the working out of substitutes naturally have thrown new work on our laboratories and sidetracked research that had great promise. However, the development of substitutes has brought to light much knowledge that will be valuable in solving research and production problems in the future, Mr. Schell reported.

Railroads Knee-Deep in Wartime Transportation

▪ *Southern New England*

The railroads are now carrying six times as many troops as in the last war, moving regularly 2,000,000 a month – 60% of whom are traveling in Pullmans, said Charles E. Smith, vice-president of the New York, New Haven & Hartford Railroad, at the Southern New England Section meeting of Jan. 20. The railroads are moving not only the soldiers, but their jeeps and trucks as well, he added.

In 1939 the pick-up in railroad traffic was tremendous, and that of 1940 exceeded that of 1939; that of 1941 equaled the previous record high of 1929, he reported. In 1942 railroads carried 140% more freight traffic than ever before, and 160% more passenger traffic, Mr. Smith said.

With the cooperation of the WPB and shippers, railroads are being furnished the facilities required for the enormous task thrust upon them, although normal suppliers of railroad equipment are busily engaged in the manufacture of war equipment, Mr. Smith reported.

Light cars are standard to the extent permitted by the large safety factors the railroads feel compelled to employ, said Mr. Smith in the discussion which followed his talk. Except for starting, journal bearings have the advantage over roller bearings on cars, he said. In his opinion, the New York, New Haven & Hartford will probably never buy another steam locomotive.

American Public Tends to Underrate Japanese Skill

▪ *Northern California*

The Northern California Section of the Society of Automotive Engineers devoted the March 9 meeting to becoming acquainted with SAE President Mac Short. After a short business meeting, SAE Secretary and General Manager John A. C. Warner gave a brief review of the function of the SAE on the production front. Slides were shown indicating the organizational structure of the SAE for this task, and the local members were surprised to learn that on the average some SAE committee dealing with war activities in some part of the United States meets every second day.

Following Mr. Warner's address, President Short, who is vice-president in charge of engineering of the Vega Aircraft Corp., addressed the Section on the great changes that have been effected in the engineering production equipment of this country for producing war materials. This country was not at all war-minded even after the entry of Britain and France into the present war in 1939, he said. He stated that this country is indebted to the British and French governments for placing orders for war equipment in this country at a time when the U. S. Government was not yet purchasing a sufficient amount of war materials to permit the conversion from peacetime to wartime production.

Groundwork for Organization

SAE laid the groundwork for its present wartime organization at the 1940 Summer Meeting when B. B. Bachman of the Autocar Co. was charged with the responsibility of setting up the SAE War Advisory Committee. The present committee structure was developed by Mr. Bachman and his associates so efficiently that on Dec. 7, 1941, a complete and operating organization was ready to handle the many technical problems which had to be worked out in the change to war production. He pointed out that the military equipment produced during the first six months of the war was primarily defensive equipment, as were our military tactics of that period. For example, during those early days only military machines of proved design were produced in large quantities. He went on to say that it is now possible for the production front to go on the offensive and produce experimental equipment which will give our military machine a technical edge over those of our opponents.

Mr. Short stated that it was the duty of the engineering organizations in this country to provide our military forces with a tech-

nical edge and then to see that that technical advantage is maintained. The performance of our American aircraft, has, on the whole, proved we have this advantage.

Following the completion of the address the meeting was thrown open to general discussion. G. L. Neely, Standard Oil Co. of California, inquired whether Mr. Short could compare the dollar volume of the aircraft industry with that of the shipbuilding industry. Mr. Short stated that he had no information on that comparison but could say that during the past year the dollar volume of the 4-engine bomber production equaled the peak dollar volume of the automotive industry, and the total aircraft production for the past year was more than twice as great as the peak automotive production. He went on to point out that the goal for the present year is 125,000 planes of all types, and he feels that it will be achieved.

Questioned on Enemy Planes

Mr. Winslow, Winslow Engineering Co., asked if Mr. Short could make any comparisons between the performance of our aircraft and those of our opponents. The speaker replied that he had seen the Zero fighter which is being test-flown by the U. S. Navy, and at this time could only say that the workmanship of this ship is excellent and he believes that there has been a tendency on the part of the American public to underrate the technical skill of the Japanese. He referred the audience to a recent *SAE Journal* article which more completely summarized the technical construction details of this plane. He also reported that it was his understanding that the latest Messerschmitt fighter was a very formidable machine and in no way limited by the use of ersatz materials.

R. W. Muchmore, Federal Mogul Corp., inquired whether any information could be released in regard to the cargo plane development program. Mr. Short said that he was not in a position to discuss this program, but that there is no reason to expect cargo planes will not be satisfactory, since extended experience has been obtained in building large type aircraft in the bomber production program.

E. J. McLaughlin, Standard Oil Co. of California, inquired as to the problem of delivery and supply of aircraft to the fighting fronts. The speaker replied that this was a very great problem at the present time and one which he was not at liberty to discuss in detail – except that he would like to point out that the very nature of the airplane caused it to exceed its lines of supply so that in a number of instances the only way an airplane could be supplied was by other airplanes due to the ability of the plane to completely outstrip other modes of transportation.

Dr. A. G. Cattaneo, Shell Development Co., asked if any comparison could be made between the planes made in the Southern California ideal climatic conditions and those built in other parts of the country. The speaker reported that he believed the climate was, of course, in no way involved in the production of the planes but it was quite possible that the Los Angeles area has achieved more publicity with their production than some other production areas due to the fact that they are producing primarily land planes, which usually reach the fighting fronts more rapidly than the planes of the carrier type.

SAE Detroit Section Leaders Welcome Rubber Director Jeffers

J. C. Zeder, Chrysler Corp., Detroit Section vice-chairman; E. W. Austin, Timken Roller Bearing Co., Detroit Section chairman; Rubber Director William M. Jeffers; and R. J. Waterbury, Chevrolet Motor Division, General Motors Corp., vice-chairman, Detroit Section Passenger Car Body Activity

"Cocksure" Synthetic Plants Will Produce As Rated, Jeffers States

■ *Detroit*

The nation's rubber director, William M. Jeffers, told the SAE Detroit Section at its March 15 meeting that he is sure – "cocksure" – that the nation's synthetic rubber plants will produce as rated. Some will even produce more than their rated capacity.

"The best job will be done by the smartest fellow, and it will be our job to see that the others do as well," he added. K. T. Keller, president of Chrysler Corp., presided.

The session which Mr. Jeffers addressed was a closed meeting at the Book-Cadillac.

He indicated that he is confident there will be enough rubber to keep America on wheels and that the civilian economy will be kept on an even keel.

The rubber program was hampered in its early days by the existence of "too many experts."

The Army needs all the rubber it can get and virtually all synthetic production will be turned over to it. He complimented the Army for the real job it is doing on rubber conservation, as demonstrated to him when he visited the Detroit Tank-Automotive Center earlier on the meeting day.

Not enough thought has been given to civilian problems, he stated, but the country and Congress are now appreciative of this situation.

From the outset, Mr. Jeffers repeated, he has said we cannot take America off wheels because there is not enough transportation to warrant the sacrifice of any of it. He is not at all in sympathy with the plan to take the fifth wheel or tire from passenger cars, because the tires will be better off in the hands of the individual car owner than stored in a warehouse. Also, he is not in favor of confiscation of unused passenger cars that have been placed in storage. Lack of other transportation facilities will soon see these cars on the road.

Expressing his faith in the American people, Mr. Jeffers said that they will do what is to be done "when they know what it is."

Gas rationing is here for a long while, especially in sections where there is a gas shortage as well as a rubber shortage, as in the East. But gas rationing may become more imperative throughout the country in view of the large plane program and its drain on gasoline supplies.

The reason for easing the retread regulations is to encourage the people to have tires retreaded before the carcasses are destroyed. This will prevent the ruin of tires which have life in them.

Mr. Jeffers, however, sounded a warning that things could happen in this war which would take materials from the synthetic program, thereby upsetting the present optimistic picture.

Recalling that Detroit was ill-humored at the start of gas rationing and that the trucking interests viewed with suspicion the appointment of a railroad man like himself to a position which might enable him to exert pressure on transportation, Mr. Jeffers noted that those sentiments have disappeared.

He answered questions willingly at the conclusion of his address, stating in reply to a question that we never again will be caught dependent on Malaya for rubber and that "if we *want* rubber from Malaya," the return of these resources to production cannot be accomplished until we have repaired any destruction wrought by the Japs. Hopes for the importation of 30,000 to 40,000 tons of rubber from Brazil this year were expressed. At present there is a virtual migration of thousands of tappers into the area abandoned since 1912. Of charges that there is a black market out of Russia based upon sales by the Japanese to the Russians, he said "we hear about it, but can't put a finger on it. No such rubber has reached us." Asked where designers should submit ideas on tires that would conserve rubber, he said that his office was anxious to hear such suggestions.

While in Detroit, Mr. Jeffers visited the Chrysler Tank Arsenal, Willow Run, and the U. S. Rubber Co.'s plants, in addition to holding a conference with officers at the Detroit Tank-Automotive Center and attending a session of the Automotive and Rubber Industries Tire Committee under the chairmanship of J. C. Zeder of Chrysler Corp.

T&M Reports Projects To Coordinating Group

The SAE-ODT Maintenance Methods Coordinating Committee at its meeting of Feb. 26 in the ICC Building, Washington, reviewed the work of its subcommittees. Chairman William J. Cumming presided.

This review disclosed that seven of these committees have submitted reports to the Office of Defense Transportation and that three more are before the Coordinating Committee for consideration with the expectation of early completion of five more reports.

Among those committees that have submitted reports were:

Committee No. 1: Reconditioning Blocks – Fitting Sleeves, D. B. Erminger, chairman.

Committee No. 2: Pistons to Fit Reconditioned Cylinders, James E. Higgins, chairman.

Committee No. 3: Engine Bearings, Replacement Technique for Replacement or Fitting, Albert B. Willi, chairman.

Committee No. 14: Preventive Maintenance and Inspection Procedure, E. N. Hatch, chairman.

Committee No. 29: Storing Vehicles and Preparing Vehicles for Service After Storage, T. C. Smith, chairman.

Most of the committee work is directed towards educational effort by ODT and in most cases copies of the reports by the thousands have been distributed by Government agencies. However, Committee No. 29 "Storage of Vehicles and Preparing Vehicles for Service After Storage" presented a report that was used by ODT as a consulting service in preparing regulations for the storage of vehicles which was actually done under the sponsorship of WPB.

Committee No. 17: Standard Practice Instructions, has completed its work in that it has made a presentation and had approved as an SAE Recommended Practice its recommendations for standard maintenance instructions and a filing system for the instructions. Actually it is continuing in an advisory capacity to ODT in obtaining compliance with the Recommended Practices, and doing more work than ever before. Chairman J. Willard Lord feels that the work of the committee will not be accomplished until there is general acceptance of the project.

Cold Welding, a process about which there has been much mystery, will soon be brought out into the open by Committee No. 30, under the chairmanship of H. B. Truslow. The report is before the Coordinating Committee and should be ready for presentation to ODT and then general release in the near future.

THE NAVY NEEDS AUTOMOTIVE ENGINEERS

RECENT expansion in naval surface vessels, submarines, aircraft and ordnance equipment has created several hundred additional billets for officers trained in aeronautical, automotive or mechanical engineering. These officers are needed to serve in a variety of enginering duties ashore and afloat, the Navy announced.

A call has been issued for qualified engineers to fill new vacancies existing in development, inspection, operation and maintenance of the Navy's mechanical equipment. The Navy's needs for engineers who have had training or experience in the fields of aeronautics or aircraft, automotive or diesel engines are considered particularly urgent.

In this emergency the Navy needs physically qualified men up to the age of 50 years who hold degrees in aeronautical, automotive, mechanical or electrical engineering, and who have practiced in the field of engineering since their graduation. In lieu of a degree, candidates should have 10 to 15 years of experience in the field of engineering and should have proof of having had responsible charge of work and a recognized standing in the profession. The Navy announced that men who have less than 10 years' experience, but who have successfully completed two or more years of college work leading toward an engineering degree, also will be given consideration.

Qualified engineers are urged to apply for a commission at the nearest Office of Naval Officer Procurement. These offices are located in principal cities throughout the United States. (This notice is inserted at the request of the Bureau of Naval Personnel, Navy Department, Office of Naval Officer Procurement, 33 Pine St., New York, N. Y.)

Members and guests of SAE Transportation & Maintenance – ODT Committee No. 24, on Cooling System Maintenance, are progressing toward completion of their report for the Office of Defense Transportation. Seated left to right are R. A. Willihaganz, Linde Air Products Co.; W. R. Herfurth, R. H. Macy & Co., Inc.; George E. Stewart, United Parcel Service; D. H. Green, National Carbon Co., Inc., chairman of the committee; H. C. Duus, Zerone-Zerex Division, E. I. duPont de Nemours & Co.; M. E. Nuttila, Cities Service Oil Co.; J. J. McCarron, Consolidated Telegraph & Electrical Subway Co. Standing left to right are L. R. Gwyn, Jr., Railway Express Agency, Inc.; E. N. Hatch, American Brakeblok Division, American Brake Shoe & Foundry Co.; R. F. Archibald, National Carbon Co., Inc.; H. M. Smith, Connecticut Railway & Lighting Co. Committee members absent from this meeting are J. Askin, Radiator Division, Fedders Mfg. Co., Inc.; Edward Chadwick, Little Falls Laundry Co.; C. E. Smith, Burlington Transportation Co.

Suggests Planning Qualities of Materials Before Building Them

▪ Washington

The March 15 meeting of the Washington Section was addressed by Lt.-Com. Emerson W. Conlon, USNR, on "Influence of New Materials on the Structural Design of Airplanes." Com. Conlon said that many samples of new materials are received by the Navy each month and undergo a series of tests to determine their suitability for use. A great step forward, in his opinion, will have been taken when materials are designed and built to possess certain definite known qualities.

Plywood, magnesium alloys, and plastics have had a marked effect on the design of planes, the speaker declared. Unfortunately, the tendency is to postpone their utilization until the war ends, he added, although unforeseen circumstances may bring about need for substitutes for which we are unprepared.

Tractor WEC Makes Valve Steel Report

Five major recommendations were made to the Farm Machinery and Agricutural Division of the War Production Board by the SAE Tractor War Emergency Committee in a report on critical material in inlet and exhaust valves used in tractors, submitted late in February. Responding to a WPB request, the SAE-TWEC recommended that:

1. Two-piece exhaust valves be used. Thus, the alloy-steel head can be retained, while making the stem of carbon steel.
2. The alloy content in the head of exhaust valves be restricted to 1.00-1.50% nickel maximum and 20.00-22.00% chrome maximum.
3. Stems of exhaust valves be made of carbon steel.
4. Inlet valves be made of carbon or Amola steel.
5. Air-cooled engines be excepted from the restriction.

Concurrence of the SAE War Engineering Board in these recommendations was asked for and obtained by SAE-TWEC before their submission to WPB, thus giving the recommendations the backing of both these important SAE war technical groups.

Members of the Valve Subcommittee, which submitted the report, are: Elmer McCormick, chairman, John Deere Tractor Co.; O. R. Schoenrock, J. I. Case Co.; and L. A. Gilmer, Oliver Farm Equipment Co.

SAE "Recommended Practices" Issued for Wartime Use

Issuance of SAE War Emergency Recommended Practices has been authorized by the SAE Council.

The procedure to be followed in the development and issuing of this new form of recommended practice is covered by an amendment to the regulations of the Standards Committee designed to speed action and at the same time to provide proper safeguards. In addition, this amendment provides that War Emergency Recommended Practices are cancelled automatically by the termination of hostilities.

An Executive Committee of the Standards Committee has been created which has general direction of War Emergency Recommended Practice projects. This Committee consists of the chairman of the Standards Committee as chairman and five members. Projects will be handled through the regular divisions of the Standards Committee, usually by reference to an appropriate subdivision.

The tentative report and recommendations of a subdivision will be circulated to the members of its parent division and to a representative cross-section of affected industry for comments and suggestions. In its final form, the subdivision report goes direct to the Executive Committee for approval. During its consideration of the report, the chairman of the Division through which the report comes, or his representative, is a member of the Executive Committee.

War Emergency Recommended Practices will be published in mimeograph form except where the General Standards Committee directs publication in the SAE Handbook.

SAE Tractor War Emergency Committee at Work on Growing Program

A quorum of the SAE Tractor War Emergency Committee, meeting in Chicago on Feb. 26, reviewed seven important projects requested of their group by Government agencies. The committee was organized on Aug. 3, 1942, to serve the wartime engineering needs of the industry, and is a factor of growing importance.

Left to right: L. A. Gilmer, Oliver Farm Equipment Co.; W. F. Strehlow, Allis-Chalmers Mfg. Co.; T. A. Bissell, SAE staff representative; Chairman A. W. Lavers, Minneapolis Moline Power Implement Co.; E. F. Brunner (guest) Goodyear Tire & Rubber Co.; Elmer McCormick, John Deere Tractor Co.; O. R. Schoenrock, J. I. Case Co.; and E. A. Petersen, representing Member L. S. Pfost, Massey-Harris Co.

Among the members absent from the meeting were J. M. Davies, Caterpillar Tractor Co.; C. G. Krieger, SAE vice-president for the Tractor Activity and acting director of the Farm Machinery & Equipment Division, WPB; L. B. Sperry, International Harvester Co.; Mr. Pfost; D. A. Milligan, Cleveland Tractor Co.; S. C. Turkenkoph, B. F. Avery & Sons Co.

Reporting progress on a wide range of reports and recommendations to various Government agencies on wartime design and use of tractors, the SAE Tractor War Emergency Committee met recently in Chicago, with Chairman A. W. Lavers presiding.

Among the reports made were:

Progress on a study comparing rubber tires and steel wheels. Elmer McCormick, chairman of the Rubber Tires vs. Steel Wheels Committee, pointed out that the study was to compare rubber-tired and steel-wheeled tractors from the standpoint of over-all efficiency, including the effects upon fuel consumption.

Reporting upon his committee's work on cast-iron-backed bearings, Chairman W. F. Strehlow summarized the survey being conducted by his group. A program of tests on these bearings will be initiated as soon as test bearings can be delivered. The savings of copper that can be effected by using cast-iron or malleable-iron backed bearings are being estimated.

Chairman L. A. Gilmer of the Cast Crankshafts and Camshafts Committee reported that cast camshafts are in common use, and that all manufacturers except one using forged camshafts could change over to castings with little difficulty. Only one tractor maker, he said, was using a cast crankshaft. Some companies could shift, but others would require major design changes.

An example of close coordination with other SAE engineering groups was reported by Chairman O. R. Schoenrock of the Alloy Steel Committee and Chairman Lavers of the SAE-TWEC. Paul Eddy, chairman of the SAE War Engineering Board's Iron & Steel Committee, turned over a complete set of minutes and reports. A liaison will be established to insure fullest dissemination of technical information on alloy steels.

Members were urged by Chairman Lavers to send all information available on gasoline consumption to Chairman L. B. Sperry of the Fuel Consumption of Tractors Committee for his proposed report.

Cargo Plane Instrumental in Future Commerce Development

▪ *Texas*

"After the war, we will still be making planes. Military needs will gradually ease off, while the demands of civilian air transportation will increase so there will be no great letdown immediately," predicted Col. John H. Jouett, executive vice-president of Higgins Aircraft, Inc. and for 20 years an Army flier, at the Texas Section Feb. 10 Meeting.

In his first appearance as a speaker since he left the presidency of the Aeronautical Chamber of Commerce of America last fall, Col. Jouett made a progress report on the preparations of A. J. Higgins for the construction of 1200 Curtiss C-67 plywood cargo planes. He said that the large factory will probably be completed by June, and the first airplane will be completed 180 days later.

Sees Development of Remote Places

When the war ends, Col. Jouett foresees the winning nations building back their prosperity by development projects in parts of the world little affected by the war, such as South America. "The nation that gets there fustest with the mostest cargo will be the one that will do the job," he said. "That," he added, "is where the cargo plane and the passenger plane as well will come into the picture."

Col. John H. Jouett, left, tells the audience at the Texas Section Feb. 10 meeting about plans and preparations of A. J. Higgins for the construction of plywood cargo planes. Allen Guiberson, right, chairman of the Section, presided over the meeting

Air cargo development after the war, in his opinion, will give Dallas the advantages a seaport had in pre-war days.

In the audience were members of the SAE Materials and Processes Committees for engines, airframes and accessories, meeting in Dallas to revise standards for materials and processes to be used by the entire aviation industry.

SAE Coming Events

April 8-9 — SAE National Aeronautic Meeting
Hotel New Yorker—New York

May 5-6 — SAE National Transportation and Maintenance Meeting
Pennsylvania Hotel—New York

June 2-3 — SAE Diesel Engine and Fuels and Lubricants Meeting
Carter Hotel—Cleveland
(Auspices of Diesel-Engine Activity, Fuels & Lubricants Activity and Cleveland Section.)

June 9-10 — SAE War Materiel Meeting
Book-Cadillac Hotel—Detroit
(Auspices of Truck and Bus Activity, Passenger-Car Activity, Production Activity and Detroit Section.)

Baltimore – April 8

Engineers Club; dinner 6:30 p.m. Speaker to be announced.

Chicago – April 13

Hotel Knickerbocker; dinner 6:45 p.m. Electric Starters, and Problems in Cold Starting – John H. Little, electrical engineer, Chevrolet Division, General Motors Corp.

Detroit – April 12

Horace H. Rackham Educational Memorial Bldg.; dinner 6:30 p.m. How the Army Trains a Pilot – Brig.-Gen. Luther S. Smith, director, Individual Training, Army Air Forces.

Indiana – April 22

Antlers Hotel, Indianapolis; dinner 6:30 p.m. Aluminum Pistons for Aircraft – E. J. Willis and R. G. Anderson, Aluminum Co. of America

Kansas City – April 26

Continental Hotel; dinner 6:30 p.m. Aircraft Manufacturing Problems – George B. Arnold, assistant general manager, Commonwealth Aircraft, Inc.

Metropolitan – April 15

Hotel Edison, New York City; dinner 6:30 p.m. Petroleum's War Synthetics – George H. Freyermuth, assistant manager, Engineering Division, Sales Dept., Standard Oil Co. of N. J. Bouncing Molecules – movie on synthetic rubber by Standard Oil Co. of N. J.

Milwaukee – April 2

Milwaukee Athletic Club; dinner 6:30 p.m. Tank Power Plants – Major Howard R. Hammond, Armed Forces Board, Fort Knox. American Tanks in Action – movie.

New England – April 15

Engineers Club, Boston; dinner 6:30 p.m. On the SAE Battlefronts – Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE.

Northern California – April 13

Engineers Club, San Francisco; dinner 6:30 p.m. Maintenance of Aviation Engines – Lt. Frazier, Naval Air Station, Alameda, Calif.

Oregon – April 9

Lloyds Golf Club, Portland; dinner 6:30 p.m. Fuels and Lubricants Meeting. Speaker to be announced.

Philadelphia – April 14

Engineers Club, Driver and Mechanic Training Meeting; 4:00 p.m. Driver Training Programs – Dr. Amos Neyhart, Pennsylvania State College. Practical Application of Driver Training Theories – Robert Galey, Supplee-Wills-Jones Milk Co. Driver Training Procedures – John Hanna, Atlantic Refining Co. Dinner 6:30 p.m. Standardizing Army and Civilian Nomenclature – Col. T. E. Preble, Ordnance Department. 8:00 p.m. Standard Practice Instructions – J. Willard Lord, Atlantic Refining Co. Discussion by H. L. Carr, International Harvester Co., and D. Switzer, Federal-Mogul Corp.

Southern California – April 2, 16 and 30

April 2 – Clark Hotel, Los Angeles; dinner 6:30 p.m. Preventive Maintenance as a Usable Tool – Wallace Linville, chief automotive engineer, General Petroleum Corp.

April 16 – Hollywood Roosevelt Hotel, Los Angeles; dinner 6:30 p.m. Aircraft Accessories Meeting. Technical Chairman – George Tharratt, chief engineer, Adel Precision Products Corp.

April 30 – Clark Hotel, Los Angeles; dinner 6:30 p.m. Tractor and Power Meeting. Technical Chairman – H. W. Thayer, superintendent of equipment, City of Los Angeles, Department of Water and Power.

Southern New England – April 16

Bond Hotel, Hartford; dinner 6:30 p.m. On the SAE Battlefronts – Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE. Helicopters – Charles Morris, Vought-Sikorsky Aircraft Division, United Aircraft Corp.

Southern Ohio – April 5

Biltmore Hotel, Dayton; dinner 6:00 p.m. Steam-Propelled Aircraft – Edmund B. Neil, mechanical engineer, Denham & Co.

▪ Oregon

The SAE Oregon Section held a luncheon at Lloyds Golf Course during the 33rd Session of the Loggers Congress which was recently held in Portland. Arrangements for the luncheon were handled by Ed. Dagner, Utility Trailer Sales Co. (left), chairman for the day, and Z. C. R. Hansen, International Harvester Co. (right), Section chairman. Speakers were Fred B. Lautzenhiser, technical consultant, WPB, and E. N. Kimberlin, inventor and designer, Heating Equipment Co. This was the largest turnout of members and guests which the Section has had for many months.

Expects Car Dealers To Survive War Era

▪ New England

"How the Car Dealer Is Faring in Wartime," was discussed in a paper presented by Frank E. H. Johnson, Noyes Buick Co., at the March 11 meeting of the New England Section in Boston. "In any group of operators carrying on the same kind of business," he said, "even in normal times, you find considerable variation in application of methods, degrees of efficiency, amount of profit derived from same volume, and so on, this varying from what we might call excellent down to poor. The main object of any business is to make a profit, so if we take a representative group, add their profits, and divide by the number in the group, we arrive at an average profit for the group. So my remarks deal with the average of a group of car dealers numbering about 70.

"The group I'm referring to is one with which I have been in touch and from which we have had accurate information for years. I believe the dealers in this group are representative of the sounder dealers in groups handling other lines of cars. In any business there are some 'fly by nights' who come in when things look as if there were easy pickings and go out as soon as they have 'skimmed the cream of the bottle,' but I don't think that type is true of car dealers and should be left out of our consideration."

Average Dealer Business

An average car dealer's business, he continued, is normally divided into two main departments – sales and service – the sales being subdivided into sales of new cars and sales of used cars; the service department selling parts, accessories and labor. It is from the sale of merchandise through these departments that the gross profits are derived and out of which all expense has to be paid. If after doing so any money remains, that is net profit. Mr. Johnson quoted statistics from 1939 to 1942 which showed that the burden of service gross a dealer has to shoulder increases as the car sales decrease or when car sales are shut off. In 1939 the car sales gross was 64.3% and service gross 35.7%. The picture in 1942 showed car sales gross 31.5%, service gross, 68.5%.

Manpower

And what has been happening to the car dealer's manpower, Mr. Johnson asked. Very few salesmen of new and used cars are left as such; a few are still with dealers, but now perform other duties – perhaps combining selling with them, he reported. Many have been drafted or enlisted in the Armed Forces, and the war industries have taken their toll, as well. It is certainly a credit to dealers and their mechanics that they were able to produce in 1942 within 0.9% of the very high volume of customers' labor which they did in 1941. Of course, mechanics who were doing other work in 1941, such as conditioning new and used cars, were diverted to customer work when the sales evaporated.

Should Have Reserve

On the basis of figures for net profit of an average group of car dealers from 1939 to 1942, Mr. Johnson believes that car dealers should have been able to store up a reserve to help them over a lean period, although it would seem extremely foolish for any dealer to lull himself into a sense of security just because he has been able to save some money in the past few years.

James F. Wanless, Campbell Motor Parts Corp., said that at present there is not such a serious situation on all parts, but the outlook is not bright for the future. Axles, crankshafts and some other important units are not plentiful, he admitted, and gave data on a survey that showed a number of trucks and buses are off the road at times, some for several weeks waiting for units.

Eben N. Smith, United Motor Service, who like Mr. Wanless did not prepare a paper in advance, feels that the manpower loss was the big handicap as far as rebuilt units are concerned. At present, the situation has not seriously affected the output, but he is not optimistic over the future. Women workers seemed to do their work well and kept production at par until they began getting $35 a week instead of the usual $12 or $14 some of them had previously earned. Then they began to take days off and this slowed production.

1942 Membership Increases 177%

▪ Southern California

An off-the-record talk on "Fundamental Design of Army Vehicles" was presented by W. J. Davidson, General Motors War Products, at the Feb. 19 Southern California Section meeting. Paul K. Beemer, Pacific Railway Equipment Co., gave an illustrated paper on "Dynamically Stable Spring Suspension for Railway Cars and Motorcoaches." (This paper, by Mr. Beemer and F. C. Lindvall, professor of electrical and mechanical engineering at California Institute of Technology, was published in full in the December, 1942, issue of the *SAE Journal*.)

SAE President Mac Short expressed appreciation to Southern California Section members for their effective support of SAE activities; reported to the Section that the SAE national officers and activities are in process of building effective meetings and programs despite wartime limitations; and voiced gratification for the better and finer understanding of mutual problems and opportunities which continue to grow among SAE members from coast to coast. President Short also congratulated the Southern California Section for its excellent results in membership increase, pointing out that a gain of 177% in applications had been registered in 1942.

Rubber Situation Promising

A few remarks on the rubber situation were contributed by Phil H. Drew, representing the Goodyear Rubber Co. "Last year the rubber problem was gloomy, but now things are more promising. It looked as though there would be few tires for several years, but we are in better position than we had hoped for," he reported. "The reclaimed rubber tires that we are making," he added, "will last for 12,000 miles at 35 mph. The good tires that were turned in when gasoline was rationed will meet immediate needs."

Synthetic rubber developments and improvements are progressing, Mr. Drew said, adding that he believes synthetic tires will be generally available by 1945.

Driver and Mechanic Training Meeting

Philadelphia Section

Philadelphia, April 14

4:00 p.m.

"Driver Training Programs"
—Dr. Amos Neyhart, Pennsylvania State College

"Practical Application of Driver Training Theories"
—Robert Galey, Supplee-Wills-Jones Milk Co.

"Driver Training Procedures"
—John Hanna, Atlantic Refining Co.

6:30 p.m

DINNER. "On the SAE Battlefronts"—*Mac Short, vice-president, Engineering, Vega Aircraft Corp., and president, SAE.* "Standardizing Army and Civilian Nomenclature"—*Col. T. E. Preble, Ordnance Department*

8:00 p.m.

"Standard Practice Instructions"
—J. Willard Lord, Atlantic Refining Co.
—Discussion by H. L. Carr, International Harvester Co., and D. Switzer, Federal Mogul Corp.

Engineers Club, 1317 Spruce St.

NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between Feb. 15, 1943, and March 10, 1943.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

Buffalo Section

Chrzan, Theodore J. (A) technical service department, Clark Bros. Co., Inc., Olean, N. Y.

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Chicago Section

Breitsameter, Frank J. (J) ordnance inspector, U. S. Army, Chicago Ordnance District, Chicago (mail) 2024 Flournoy St.

Johnston, E. H. (M) chief metallurgist, Standard Forgings Corp., East Chicago, Ind.

Jones, Harold F. (M) chief lubrication engineer, Cities Service Oil Co., 919 N. Michigan Ave, Chicago.

Osborne, Lyle Edwin (J) experimental engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) 1310 N. Lafayette.

Owens, Richard Harrison (J) chief model test engineer, Dodge Chicago Plant, Chrysler Corp., 7401 S. Cicero Ave., Chicago (mail) 273 Nuttall Rd., Riverside, Ill.

Peterson, Robert H. (J) project engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) 2632 Larch Way.

Cleveland Section

Abramoska, Paul (A) president, general manager, Paul Abramoska Co., 7010 Hampstead Ave., Parma, Ohio.

Bellman, Donald R. (J) junior mechanical engineer, National Advisory Committee for Aeronautics, Cleveland Airport, Cleveland (mail) 4052 Wooster Rd., Rocky River Station.

Edgerton, Alfred Dixon (J) patent counsel, White Motor Co., 842 E. 79th St., Cleveland.

Finkelmann, John L. (M) chief chemist, Warren Refining & Chemical Co., 9420 Meech Ave., Cleveland.

Glick, Julius L. (M) president and general manager, Truck Engrg. Corp., 1285 W. 70th St., Cleveland.

Gruss, Thomas J. (J) tool designer, Weatherhead Co., 300 E. 131st St., Cleveland (mail) 2986 E. 111th St.

Liss, Irwin (A) plant engineer, Thompson Products, Inc., Euclid, Ohio (mail) 1837 Alcoy Rd., Cleveland.

Mehollin, Fred W. (A) cost estimator, Weatherhead Co., 300 E. 131st St., Cleveland.

White, Nelson E. (A) manager, lubricating sales, Warren Refining & Chemical Co., 9420 Meech Ave., Cleveland.

Detroit Section

Agren, Douglas E. (J) engineer, Industrial Wire Cloth Products Corp., Wayne, Mich. (mail) 4832 University, Detroit.

Allbright, Rex (M) project engineer, Detroit Diesel Engine Division, General Motors Corp., 13405 W. Outer Dr., Detroit.

Anderson, Chester B. (J) junior engineer, Chevrolet Gear & Axle Division, General Motors Corp., Detroit (mail) 16060 Fordham Ave.

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APPLICATIONS Received

The applications for membership received between Feb. 15, 1943, and March 10, 1943, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

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Berchtold, Wallace W., chief engineer, Manley Mfg. Division, American Chain & Cable Co., Inc., York, Pa.

Buffalo Section

Farrell, George J., design draftsman, Houde Engineering Division, Houdaille Hershey Corp., Buffalo.

Myers, Don Brown, assistant to general manager, Columbus McKinnon Chain Corp., Tonawanda, N. Y.

Peacock, John F., test engineer, Sterling Engine Co., Buffalo.

Canadian Section

Douglas, Robert B., superintendent, Cana-

dian Car & Foundry Co., Ltd., Montreal, Que.

Hansen, Paul Ernest, industrial service representative, Imperial Oil Ltd., Toronto, Ont.

Palmer, Stephen Freeman, assistant manager, war products division, Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont.

Chicago Section

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Gabrisko, Edward Stanley, engineer, Buda Co., Harvey, Ill.

Hall, Waldo J., liaison engineer, Illinois Division, Bendix Aviation Corp., Chicago.

Rill, Carroll Norman, chief chemist, Nox-Rust Corp., Chicago.

Robb, Arnold L., junior technician, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Zack, Hans J., proprietor, The Zack Co., Chicago.

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